

# AMERICAN





## A NATION UNITED BY TELEPHONE

JUST twenty-five years ago, on January 25, 1915, the first transcontinental telephone call was made. East and West were united in dramatic ceremony.

President Wilson talked from the White House across the country, testifying to the nation's pride "that this vital cord should have been stretched across America as a sample of our energy and enterprise."

The inventor of the telephone, Alexander Graham Bell, in New

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That ceremony ushered in transcontinental service twenty-five years ago. At that time it cost \$20.70 to call San Francisco from New York. Now it costs \$6.50 for a station-to-station call and only \$4.25 after

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## AMERICAN FORESTS

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Published monthly by

**THE AMERICAN  
FORESTRY  
ASSOCIATION**

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The American Forestry Association is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities, of which publication of *AMERICAN FORESTS* is one, seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, in order that they may contribute permanently and in the highest degree to the welfare of the nation and its people.

In addition to publication of two magazines — *AMERICAN FORESTS* and *CONSERVATION*, both designed to keep before the people of the country important conservation questions and issues, the Association carries on educational projects in various fields including forest fire prevention, reforestation, protection and propagation of fish and wildlife, upstream flood control, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, development of forestry by private endeavor and the teaching of conservation in the schools of the country.

The Association is independent. It has no connection with any federal or state governments. It is non-political and non-commercial. All its resources and income are devoted to the advancement of conservation. It has been so operated since its founding in 1875. All citizens interested in forestry and conservation are eligible for membership.



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# AMERICAN FORESTS

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*Happy New Year!*



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Member A. B. C.

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# READERS' FORUM

## CAMILLO SCHNEIDER IN GERMANY

SIR: I just got a letter of my friend, Mr. von Schroeter, the president of the German Dendrological Society, who informed me of the necrology on me in the October issue (Readers' Forum) of *AMERICAN FORESTS*. I wonder who spread the news of my death. Fortunately, I feel still very well and I am rather busy with my monograph on *Berberis* which I want to finish as soon as possible, besides doing my normal work as a landscape architect and co-editor of the garden magazine, *Gartenschonheit*.

In spite of the rather trying times I enjoy life very much. I should be glad to see the U.S.A. again after we have got a lasting peace. I had a splendid time at the Arnold Arboretum from 1915 to 1919.  
—*Camillo Schneider*, Berlin, Germany.

## THEY LIKE THE TRAIL RIDERS

SIR: Although I have never ridden with your Trail Riders of the Wilderness, nor have I had the pleasure of talking with anyone who has, it must be a wonderful organization attracting a fine lot of people, if I am to believe the things I heard about them in New Mexico last summer.

I happened to be visiting in Silver City when the Trail Riders were there and their enthusiasm over their trip into that marvelous Gila country was a thing to behold. Somebody told me that they came all the way from New York and Massachusetts, from Michigan and Ohio, from Missouri and North Carolina, even from California. If this is true, it seems to me that The American Forestry Association is doing a splendid thing in making it possible for American men and women to really enjoy their own country, particularly that part of it so few of us ever knew existed.—*Mrs. Clyde Harper*, Baltimore, Maryland.

## A VIEW OF THE SANTEE PROJECT

SIR: "Conservation Over the Dam," by Erle Kauffman, which appeared in the October and November issues of *AMERICAN FORESTS*, is the first clear and thorough expose of the Santee-Cooper project in South Carolina I have seen. Mr. Kauffman has been fair to both sides. To me the project can be summed up as a wasteful undertaking — wasteful from

whatever angle one cares to view it. It is my hope that The American Forestry Association will wage relentless war against its continuance.

The most significant aspect of the case is the loss of a timberland able to supply wealth to the state for years. Neither power from the dams nor an inland waterway are needed. Furthermore, there are ways of employing men out of work so that what is done will benefit all. That such truths can be ignored only serves to prove that the minds of the men indorsing the project are filled with greed for political prestige.

Are we, the American people, to stand aside while these few men help themselves to a slice of the nation's wealth and natural beauty which, when gone, can never be restored? How can the project be stopped? — *Devereux Butcher*, Lumberville, Pennsylvania.

## THANK YOU, BARRINGTON MOORE

SIR: Remembering Washington days, I want you to know that I still read *AMERICAN FORESTS*, as well as several other conservation magazines, and to add that you are doing a magnificent piece of work. You have a splendid magazine, attractive, interesting, informative and authentic — the spearhead of the forestry and conservation movement in America today, as well as the bulwark against attacks from the selfish forces on the one hand and misguided fanatics on the other. Only yesterday I was reading a popular article on forests in *Bird Lore* in which the author spoke of using *AMERICAN FORESTS* in teaching his classes. I am sure that this is only one of thousands of instances in which the magazine is influencing the rising generation as well as the grown-ups.

I was looking forward to the pleasure of seeing you and others in Washington this autumn, but the war upset our plans. I have volunteered for timber control work but haven't been called up yet.—*Barrington Moore*, Taunton, England.

## A POEM THAT PAID ITS WAY

SIR: Thank you for your courteous words concerning my bit of verse, and, since it is not absolutely necessary that my poems sell in order that I may eat, use

it when you wish. Incidentally, this one has already paid its way.

We were going to the Logging Congress in Portland, an almost international affair, and I was to "strut my stuff" at a big luncheon in our beautiful Timberline Lodge on Mt. Hood—in other words, to read one of my short stories, a poem and give a bit of a talk. You see, I have two books, "Flame in the Wind" and "Just Loggin'," besides other stuff, so am by way of being a writer, I suppose. I also had a new velvet afternoon dress with a bustle. I am sure you understand. The bags were packed when my superintendent-husband came in, said trucks were stuck in the mud, logging train off the track, and for me to telegraph that we could not be at the Congress. I did, then took the dogs and a book and pencil and climbed the logging road, saw the vine-maple, sat on a stump and played with words until all sense of frustration was gone and I had returned to the proper mental adjustment. So you see why I claim the little poem has paid its way, and I gladly contribute it.

## TO THE WASTED DEAD

They had logged the mountainside,  
And a rubble of dead and worthless trees  
Lay scattered wide;  
But on an altar of grim, gray stone,  
In the edge of the slaughtered wood,  
Late autumn burned a requiem flame  
Where one vine maple stood.

—*Rona Morris Workman*,  
Westfir, Oregon.

## WORKING FOR PEACE AND GOOD WILL

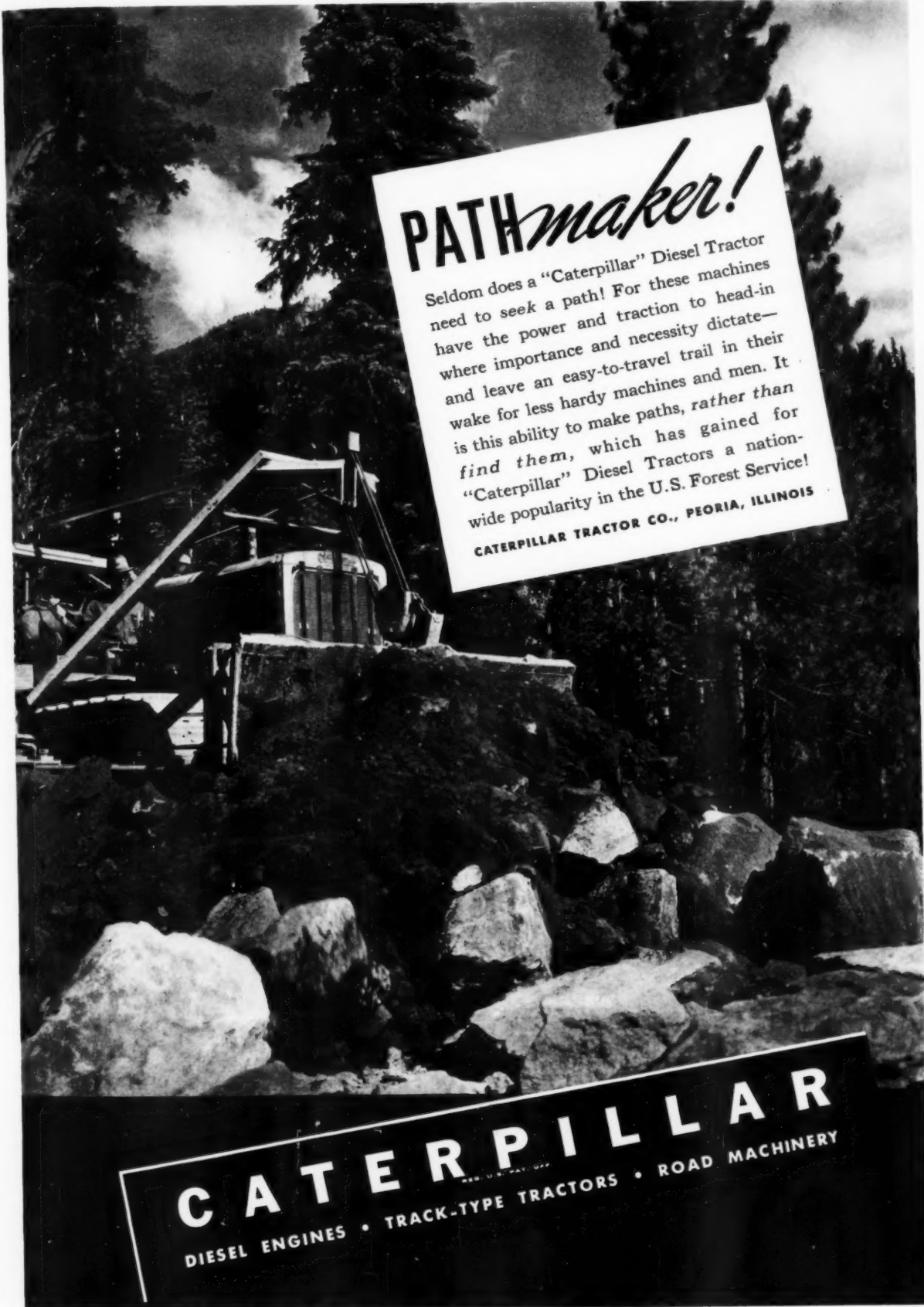
SIR: I want to tell you how much I enjoyed the story of the National Community Christmas Tree in the December issue of *AMERICAN FORESTS*. Though I have been present at all but two of the celebrations—the first two—I did not realize how much unselfish "labor of love" is put into the occasion by so many individuals and organizations. Certainly the people of Washington, indeed the people of the country, owe a debt of gratitude to those responsible for the National Community Christmas Tree. I, for one, will look upon its bright lights this Christmas with new pride in the American way of working together for peace and good will. If the other countries of the world would follow this example we would indeed have an International Tree of Peace.—*Mrs. Elizabeth Brown*, Washington, D. C.

## AMERICAN FORESTS IN HOSPITALS

SIR: We acknowledge with thanks the one hundred copies of *AMERICAN FORESTS* received at this office December 1. Your ready response and generous cooperation with our Society is a source of gratification to us and is a most effective agency for bringing a wholesome interest and stimulus into restricted lives.—*Helen A. Brodhead*, executive secretary, Hospital Reading Society, New York.

AMERICAN FORESTS



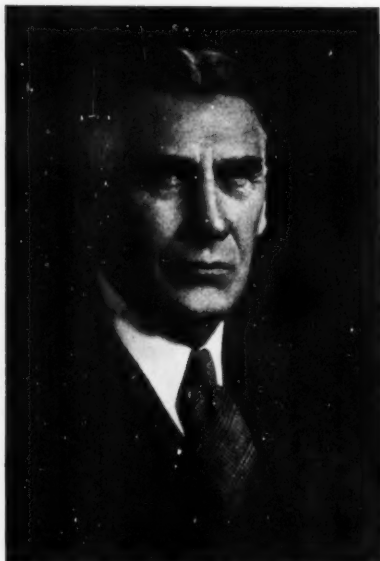


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FRED WILSON BESLEY  
State Forester of Maryland

■ Dean of State Foresters, Fred Wilson Besley, having served seventeen years as a Director of The American Forestry Association, stands fifth on the Board in point of years of service. First elected in 1922, he is now serving his fourth consecutive term.

Born in Vienna, Virginia, February 16, 1872, he was graduated from Maryland Agricultural College in 1892. Engaging in forest work for the government, he made early reconnaissance and growth studies in Michigan, New York, Kentucky and Texas. In 1904, taking his master's degree in forestry from Yale, he re-entered the Forest Service and was sent to Nebraska where the largest forest nursery then in the United States was located.

## OUR DIRECTORS

Here he conducted nursery and planting operations, supervising the early and interesting experiments there in binding the shifting soils of Nebraska's sand hills by the planting of over 350,000 trees. Later he conducted successful planting experiments in Colorado in the region of Pikes Peak.

In 1906 he was elected by the newly created Board of Forestry in Maryland to head up its work and he has since served continuously as State Forester — thus his record for the longest continuous service of any state forester in the United States. The headquarters office of the Maryland State Board of Forestry is in Baltimore. Starting from very small beginnings in 1906, the department has grown steadily under Mr. Besley's able leadership and broadened its influence until now it ranks with that of the most up-to-date and progressive of the states, both as to organization, personnel, and the work it is doing for Maryland.

Writing widely in his field, one of Mr. Besley's most interesting publications, titled "The Forests of Maryland," covers comprehensively a survey and study of forest distribution, resources and use extending over eight years. He lectures on forestry at the University of Maryland and serves on several important commissions and boards. In recognition of his public service in advancing forestry in the State, the University of Maryland conferred upon him the honorary degree of Doctor of Science. A senior Member of the Society of American Foresters, Mr. Besley is past president of the Yale Forest School Alumni and of the Association of State Foresters.

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Mother Earth and have been unfaithful to her laws of productivity. It is a depressing story from the standpoint of what *has been*; a challenging story from the standpoint of what should and *can be* man's relationship to the land that nurtures him, his children, and his children's children.

Happily, we in America have awakened, tardily to be sure, to a sense of this relationship and its meaning to our material and spiritual well-being. We are trying to redeem our past sins of land abuse and thereby to redeem our land for a free and bountiful destiny. Though our efforts at times may seem haphazard and disorganized and our methods wasteful and disputable, a common objective moves us—to make peace with the soil that sustains us. Let us therefore dedicate the New Year not only to peace *on* the earth among the peoples of the world, but within our own country, to peace *in* the earth from whence comes our eternal sustenance.

If there be some who think this a dull outlook and that life holds no thrills for works of conservation, let them read Dr. Lowdermilk's article in the next number of *AMERICAN FORESTS*. It is the story of probably the greatest human achievement of land reclamation in history. The scene is laid in the little country of Holland where Dutch engineers within a few short years have pushed back the ocean and brought into flower a half million acres of living space for the Dutch people. Where once was a frontier of pounding waves is now a land of homes and towns, fields of grain and forests, gardens of vegetables and tulips waving in the breeze. And as Mother Earth's final benediction for work well and peaceably done, yearly harvests and human festivals.

\* \* \*

Last month Dr. Stevan Ruzicka, a Yugo-Slav, whose brother recently was awarded the 1939 Nobel prize for scientific achievement, visited Washington and demonstrated a process that excited the interest of President Roosevelt and other government officials. In it the President is said to envision a steel industry on the West Coast. And in that picture wood would have a prominent and basic part.

Dr. Ruzicka's process is one for converting wood charcoal to which tar is added into coke. Sawdust, slabs and other waste wood is grist for his process mill. The product is a wood coke of ninety-five per cent pure carbon, said to be superior to coke made from coal which is only eighty-two per cent pure carbon. A small amount of charcoal iron is now produced in this country and is the basis of the stronger rustless "Swedish steel."

Coke and iron are the basis of the steel industry, now centered in the East. The West, however, has supplies of iron ore and can supplement them by importations from Chile. It also has a surplus of by-product wood which cannot be utilized for lack of markets and a surplus of hydro-electric power at both the Bonneville and Grand Coulee Dams. Here then are the primary elements of a steel industry in the West.

The new process may well be an "open sesame" to forestry, particularly in the Pacific Northwest. Here several billion feet of low grade and by-product wood goes to waste yearly because of lack of utilization outlets. For want of markets for this class of material, industry must subsist mainly on the high quality wood which it can glean from the best trees, leaving low grade timber and by-product wood on the ground to decay, to increase fire hazards and to handicap the growing of better trees. In a word, incomplete utilization is the ball and chain on both western lumbering and western forestry, and no one yet has been able to crack the chain. It is not beyond the realm of possibility that Dr. Ruzicka's process may do it.

*Orin Foster*  
Editor.





# WOOD IN MODERN WARFARE

Although fast bombers, pursuit and other combat aircraft used in modern warfare are made of metal, training airplanes, as shown above, require wooden ribs and spars in wings. Furthermore, new developments in fabrication with resin glues are bringing wood back into the picture for fuselages and propellers

U.S.A., Air Corps

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AT NO time in the history of "civilized" warfare have the forests and their products been of more importance than in this day of all-destroying projectiles and impregnable defenses, of steel tanks, duralumin warplanes, and all-metal submarines, of warfare in the ether and stratosphere complementing the mechanized struggle on land and sea. Discoveries in new and wider uses of wood have gone so far that today no other material fulfills so many wartime requirements as does wood. It makes possible high explosives, dug-out shelters, "ersatz" rations, emergency material for uniforms, and liquid fuel. It takes a necessary place in the perfection of wartime communication and the transportation of ammunition and other equipment on land, sea, and in the air. So vital is wood for the smooth running of the modern fighting machine that one of the prime motives of Hitler's early seizure of Poland is reported to lie in the abundance of wood offered by the vast forest resources of that country. In short, as the German paper *Vorwaerts* states, "to be without wood in time of war is almost as bad as being without bread."

Of significance is the fact that Germany's greater independ-

ence today in the matter of war materials than at the close of the World War is largely due to her research in wood chemistry. Wood sugar has been developed to a point where it can serve as food for man or beast. Wood in the form of rayon, wood cotton, and wood wool now equals one-fourth of the total consumption of textiles in Germany. For the past five years approximately twenty per cent of wood wool has been required in all German uniforms. Lack of abundant supplies of gasoline in Europe has directed attention toward substituting gas from wood generators for liquid fuels in operating gas engines.

Despite the foregoing advances, the chemistry of wood, which enters so largely in the use of wood in modern warfare, is still not understood completely by Germany or any other nation. Wood can be looked at, burned, used in a thousand different ways, but when an attempt is made to break it down chemically great difficulty intervenes. It contains, roughly, two-thirds cellulose, one-third lignin, extractives, and a bit of ash. Cellulose comprises the wood fibers, lignin the adhesive that holds the fibers together. Many uses are found for cellulose in both war and peacetime products. It is found everywhere in articles of

By

DONALD G. COLEMAN

U.S.A., Signal Corps

Wood charcoal can now be used in gas masks to offset poisonous gases; and smokes are eliminated in the mask by special filter paper made from woodpulp



daily use—in paper, rayon stockings, cellophane, and molded brush handles. In time of war it goes into munitions—already there have been reports of the seizure by the British of a ship loaded with cellulose consigned to Germany—for guncotton is trinitro-cellulose. But until recently there was no known use for lignin. Millions

woodpulp. In spite of the advent of smokeless powder, much of which is made from wood, enormous quantities of black powder were used in the World War.



Tremendous quantities of wood are still used in the construction of army escort wagons, automobile trucks, and wheels for horse-drawn artillery — not to mention artillery and trench screens

of tons of it are thrown away every year in the manufacture of cellulose products. Chemists look forward to the day when lignin may be broken down and utilized as a major product of wood, as has been done, for example, in the case of coal tar, formerly a rank waste.

With such a background, it is a safe prediction that products from wood that are unheard of today will be used in future wars. At the same time, products made only from wood during the last war may in modern warfare be made from other raw materials. Alcohol, acetic acid, and acetone, made only from wood and in great demand for munitions manufacture during the World War, are now available in the United States from other sources.

Wood has been used by Germany for the production of nitrocellulose—the main constituent of modern high propellant explosives. Fermented sugars obtained from wood produce alcohol and other solvents used with the nitrocellulose in munitions. Glycerol, obtainable from wood, is a source of nitroglycerin, another powerful explosive long known to gangland safecrackers as “soup.” Nitroglycerin when mixed with sawdust becomes the well-known dynamite invented in 1866 by Alfred Nobel, donor of the Nobel Peace Prize.

Acetic acid from wood may be employed in the production of certain toxic gases and smokes used in chemical warfare. On the other hand, charcoal from wood can now replace the coconut-shell and peach-pit charcoal formerly used in gas masks to offset the poisonous gases of modern warfare, and smokes are eliminated in the mask by means of a special filter paper made from

Ordinarily black powders contain charcoal. The charcoal employed must possess special properties, and is made from hardwoods. Black powder goes into shrapnel, for which only a moderately powerful explosive is required to drive the bullets; and the smoke produced when the shell explodes is an actual advantage in enabling the gunners to determine the correct range. Black powder is also used to fill the rings of the time fuses with which shrapnel shells are equipped for which purpose no satisfactory substitute has yet been found.

Another product of the forest, rosin, is employed for filling the spaces between the bullets in shrapnel, so that on explosion the missiles will be evenly distributed in all directions. Its brittleness and, at the same time, its hardness, together with its low melting point, fit it admirably for the purpose. Turpentine, which is a companion product in the production of rosin, is used in flame throwers and also in the manufacture of synthetic camphor.

Subsequent wars are likely to require more explosives than in the past. This is because of the general shift to heavier caliber guns. A three-inch field gun, for example, requires about two and a half pounds of powder a shell, whereas a sixteen-inch howitzer requires approximately 120 times that amount. It is interesting to note that during the World War it required 400 artillery projectiles to kill, and eighty projectiles to wound an opponent. The American troops in effecting the capture of St. Mihiel shot more ammunition in four hours than was used during the entire Civil War.

Supremacy of the air is even more important today





U.S.A., Signal Corps

than during the World War. The last decade has brought a number of significant developments in the use of wood, plywood, and conversion products that are of particular importance to aircraft construction. The Forest Products Laboratory made major contributions to American arms during and following the World War in the use of wood in aircraft. Fortunately, this Laboratory maintained at Madison, Wisconsin, by the Federal Forest Service to find new and improved uses for wood, has accumulated an invaluable store of information on the subject.

Although there has been a shift to metal aircraft in recent years, any immediate emergency will probably again bring a demand for wood,

largely for training planes. There are many arguments that can be used in its favor for the purpose, not the least being the comparative ease with which damaged parts can be repaired without either highly skilled labor or special equipment. Through the construction of thousands of training planes wholly or in part from wood, the manufacturers of metal planes would be able to concentrate their facilities on bombers, pursuit, and other combat aircraft. In such an event, spruce would again be in demand for wing beams, wing ribs, and plywood. Here, the United States will profit from a process of kiln-drying spruce that cuts the time required for curing the wood from two years to twenty-one days—and gives a better product. The crying need of France and England today is for an airplane that can be produced with a minimum of manpower yet in large numbers and in a hurry. The construction of the modern metal airplane requires hundreds of hours of work by skilled mechanics—metal workers, riveters, and welders. In Germany, the Heinkel Works are reported to be turning out three fighters a day molded of compressed, laminated, resin-glued wood in presses capable of exerting pressures of 10,000 to 12,000 pounds a square inch. In the United States two planes of compressed resin-glued wood have been flying for more than a year. The material used in these planes consists of exceedingly thin layers of hardwood veneer bound together with the resin. So far it has been used only in fuselages, which are stamped out in two sections that are then fastened together longitudinally. One press stamps out both halves of the fuselage—and is reported to have a capacity sufficient to turn out twenty complete fuselages a day. As the density of this resin-bonded material is about one-sixth that of duralumin, it can be used in thicknesses six times that of the aluminum alloy. Its sur-



U.S.A., Signal Corps

Tanks are hard machines to stop but quick availability of timber posts properly placed can often hang them "high and dry"

face is as slick as ice, with no rivet heads to catch the wind and, with a 450 horsepower engine, is eight per cent faster than a plane of the same design with conventional riveted fuselage and the same horsepower. Speed will be stepped up more when wings of the same material are added.

A new synthetic resin treatment of wood developed at the Forest Products Laboratory should prove particularly applicable to propeller construction. It has been reported that when airplanes require an engine of 3,000 horsepower, which is now deemed highly probable, the propeller, if made of metal and of present design will weigh more than the engine. Thought is, therefore, again being directed toward wooden propellers. German and English propellers are being constructed with the outer

tary bridge builders, and all others engaged in heavy wood construction are the modern metal connectors recently devised for beam joints. Such connectors make it possible to increase the strength of heavy wooden structures many fold.

Then there is the housing of an army in great cantonments, each calling for something like 1,000 carloads of lumber to be rushed to the points of construction from all over the United States with passenger train speed. At destination, the lumber is transformed into barracks, mess halls, stables, sheds, post exchanges, and the more than a thousand buildings required to care for an army corps. The total wartime consumption of wood in the World War by the United States Army alone amounted to more than 6,000,000,000 board feet. Here plywood is



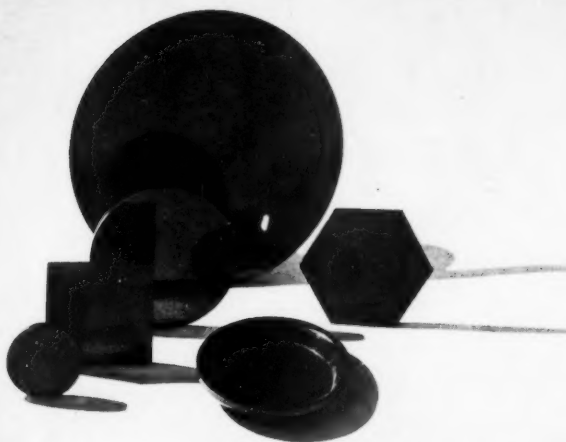
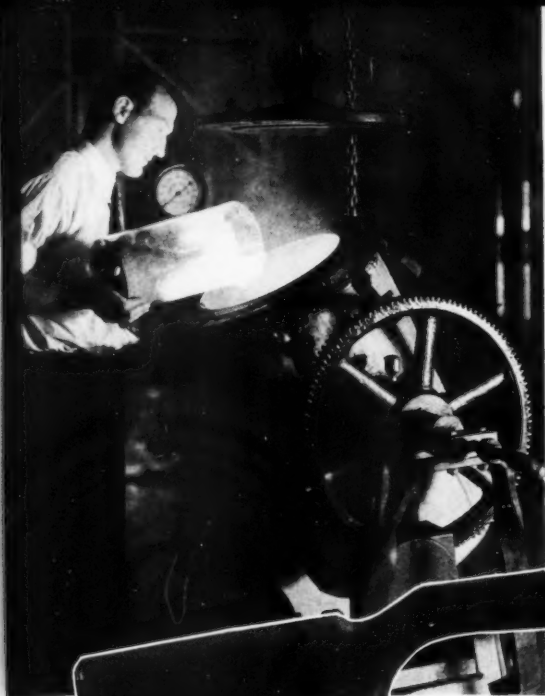
U.S.A., Signal Corps

In addition to pontoon bridges, as shown above, millions of feet of timber are needed in modern warfare for trenches, dugouts, wire-entanglement stakes and corduroy roads. During the World War as high as 30,000 trees were used daily by a single French army corps

portion of the blade of a lightweight wood, and the inner, or hub section, of compressed, laminated wood bonded with phenolic-resin glue. In some propellers hardwoods and softwoods are combined. Each lamination is sawed about one-eighth inch thick but is pressed so hard in the lamination process that its thickness is reduced by a half. The resulting propeller is very dense with an exceedingly great shear strength, which is important because the blades are detachable and are screwed into special metal hubs. Two American manufacturers are experimenting with the production of wooden propellers of this type.

Next to munitions and airplanes in importance in time of war, come ships. Every kind and type of seaworthy ship that can be built is in demand; many are of combined wood and steel. Important to shipbuilders, mili-

destined to play an increasingly important part as a result of the continued improvement in glues. Of particular interest are the artificial resin glues which open entirely new horizons for laminated wood construction and for plywood. These glues, introduced commercially about six years ago, afford the highest water-resistant joints of any known adhesive, and while long experience on this performance is lacking, exposure tests indicate promising results. Tests have indicated that joints well made with artificial resins of the phenolic type applied by the hot plate process are very difficult to destroy without destroying the wood. Since plywood consists of a combination of three or more layers of veneer with the grain of alternate layers at right angles, the material when properly glued is redistributed so that the strength becomes more nearly equal (Continuing on page 32)



Forest Products Laboratory

Above, making wood plastics from sawdust — a source material for instrument panels and a great variety of other articles which may be needed by both land and sea fighting forces. It is a potential material for gun stocks, now made of walnut

Right, chemical cooking of wood chips yields cellulose pulp for the manufacture of guncotton. Nitro-cellulose, made also from wood, is the main constituent of modern high propellant explosives. Glycerol, obtainable from wood, is a source of nitroglycerin

Below, turpentine, a forest product, is used in flame throwers. Rosin, also a product of the forest, is employed for filling the spaces between bullets in shrapnel so that on explosion the missiles will be evenly distributed

U.S.A., Chemical Warfare Service





# THE ELEVENTH COMMANDMENT

By

WALTER C. LOWDERMILK

MOSES was inspired to deliver to the Children of Israel wandering in the wilderness of Sinai the Ten Commandments to regulate man's relation to his Creator and to his fellow men. These guides of conduct have stood the test of time for more than 3,000 years. But Moses, during those forty years in the wilderness, failed to foresee the vital need of the future for an additional Commandment to regulate man's relation and responsibility to Mother Earth, whose cultivation and production must nourish all generations.

If Moses had anticipated what we have seen in north China, Korea, north Africa, Asia Minor, Mesopotamia and our own United States; namely, the wastage of land due to man's practices of suicidal agriculture and the resulting man-made deserts and ruined civilizations, if he had foreseen the impoverishment, revolutions, wars, migrations, and social decadence of billions of peoples through thousands of years and the oncoming desolation of their lands, he doubtless would have been inspired to deliver an "Eleventh" Commandment to complete the trinity of man's responsibilities—to his Creator, to his fellow men, and to Mother Earth. Such a Commandment should read somewhat as follows:

"XI. Thou shalt inherit the holy earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from overgrazing by thy herds, so that thy descendants may have abundance forever. If any shall fail in this stewardship of the land thy fruitful fields shall become sterile stony ground and wasting gullies, and thy descendants shall decrease and live in poverty or be destroyed from off the face of the earth."

But no such Commandment has been a part of man's attitude toward his occupation of the earth except in very limited areas. Man has generally been an exploiter, despoiler and destroyer of natural physical, plant and animal resources of the earth. He has brought upon himself the curse of destruction, impoverishment and desolation in vast areas.

Today literally billions of acres of originally productive lands throughout the world bear the curse of unfaithful stewards through the centuries, and their sins of land misuse are visited upon their descendants not only unto the third and fourth generations, but unto the tillers of exploited lands today. This curse upon the land, by gen-

This article was written in the biblical land of Palestine as the author was completing a fifteen months' study of man's stewardship of land down through the ages in fifteen countries of the Old World. Traveling over 30,000 miles by train, airplane, automobile, boat and afoot, Dr. Lowdermilk, as Chief of Research of the Soil Conservation Service, surveyed the land as civilization has used it and passed it down to the present generation. His special interest was human use as it relates to soil erosion, soil and water conservation and flood control. His studies took him into Egypt, Algeria, Tunisia, Libya, Trans-Jordan, Palestine, Lebanon, Syria, Iraq, Italy, France, Holland, Scotland and England. As a background to this survey he previously had made five different explorations into the interior of northern China so that in "The Eleventh Commandment" he writes with a vivid world picture before him of the sins of civilization against Mother Earth.—Editor.

erations of ignorance, neglect, lack of forethought, greed, or oppression, represents a waste to humanity so stupendous as to exceed the comprehension of the human mind.

The world is now more fully occupied by the human race than ever before. Fully two billion souls must find their daily food from the land and waters of the earth. All lands have been occupied or possessed by nations. No free land remains.

In the face of the limited area now available to the human race, the idea that man is still destroying its usefulness by inconsiderate and wasteful methods, comes as a shock to thinking people. If man is making

deserts out of productive lands, it is a matter not only of national, but of world-wide concern.

An international tragedy, emphasizing the lack of available lands for exploitation or colonization, is now taking place in the Mediterranean area. Countless refugees from Central Europe, with possessions confiscated, are fleeing from persecutions unparalleled in modern history. Their ships float for weeks, even months, unable to find a refuge. They are turned away from every port; there is no room for them on the land. But the refugees who have gained admittance to Palestine are carrying out the finest example of devotion to and reclamation of land that I have seen on three continents. What they are doing represents the possibilities of these wandering refugees if given a chance.

This overcrowded condition in a world of land hungry nations, whose soils are being impoverished by erosion and misuse while populations increase, demands a new conception of individual and national obligation to the earth and to posterity. When men are unfaithful stewards in their use of the land they bring a curse upon themselves and upon succeeding inhabitants. They find the very source of livelihood washed away, gradually and diabolically impoverishing them. Life becomes such a struggle for mere physical existence as to warp and crush the human spirit, bringing on revolutions, wars, migrations, or political and social decadence. In time the insidious forces of soil erosion and land wastage reach proportions beyond the control and resources of individual tillers of the soil; wearied and discouraged, they migrate, fight, or perish in the wrecks of misused land.

Travels through the morgues of former prosperous areas, now desolate and depopulated, are depressing to one who reads the Macbeth tragedy written far and wide on the landscape. It is appalling to see ruins of

once great cities, of civilizations and flourishing cultures, strewn like weather beaten skeletons in the graveyard of their erosion wasted lands. In north Africa we found huge olive presses littering areas where today not an olive tree grows within the circle of the horizon. Stone wine presses were there in great numbers as the only indication of the land use before man-induced erosion had transformed its productivity into desolation. Thistles and thorn-bush are the inheritance of occasional Bedouin Nomads who are ready to fight for every water hole and blade of grass which appears after rains. They pitch their tents on the ruins of magnificent stone structures, whose floors were masterpieces of mosaics, whose porticoes were supported by massive columns and whose courts were beautified by marble statuary. Behind all these

ceaseless struggles of millions of nameless toilers, before the potentially rich irrigated lands were allowed to revert again to desert, when due to wars or political decadence, the cleaning of silt from the canals was no longer continued. This valley, which formerly maintained from 30,000,000 to 50,000,000 people, supporting renowned civilizations of culture, refinement and learning, now maintains on a very low standard about 5,000,000, whose comforts and accomplishments are a sad commentary on the decadence of cultures.

The Negeb and Sinai region is believed to have supported fully 100,000 inhabitants, but now it scarcely suffices for 2,000 Bedouins. In Trans-Jordan studies by the American School of Oriental Research reveal an extensive ancient agriculture from more than a thousand



Such a lush harvest, after a thousand years or more of agriculture and right land use in rural England, well exemplifies the first clause of the proposed Eleventh Commandment: "Thou shalt inherit the holy earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shalt safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hills from overgrazing by thy herds, so that thy descendants may have abundance forever."

ruins is the stirring drama of hunger, invasion, and destruction of life. Death of fertile lands and of its people is a nameless tragedy written across landscape after landscape.

It fills one with consternation to visit regions which have lain desolate and unproductive for centuries with their beautifully cut stone dams completely silted up as at Kurnub, in the Negeb of Palestine, or terraces broken down as above Petra and Jerash, in Trans-Jordan, or aqueducts crumbled as in North Africa. Such areas were abandoned when the erosion wasted soils would no longer feed the inhabitants.

It was astonishing and revealing to find Mesopotamia literally covered with miniature mountain ranges of silt, some ten, twenty and up to fifty feet in height, piled beside the ancient irrigation ditches. This silt, the offspring of erosion in overgrazed watersheds, tells a story of the

years B.C. to the 7th century A.D. The loss of fertile soil and the resulting reduction of food supply from the lands of Trans-Jordan are greater than the proportional decrease in population. The food supply and the standards of living and embellished cities among the cultured ancients have little counterpart in the rough stone houses and wretched villages, and in the camps of illiterate Bedouins of today.

The staggering soil wastage of North China is unbelievable. Historical records show that mountain slopes of North China were once heavily forested. Populations increased and exceeded the carrying capacities of alluvial valleys, thereupon farmers cleared away the forests and pushed cultivation higher and higher up the slopes. Trees were cut, the fertile soils were dug up and planted to crops. In from three to twenty years, depending upon gradients of slopes, the soils were washed off and farmers

abandoned these fields to clear new lands. Finally, this shifting cultivation was pushed up slopes to the summits. Accelerated erosion cut great gullies, and bared the rocky flanks of the mountains. Today, hundreds of millions of acres have been seriously reduced from productivity to barren slopes and labyrinths of gullies. Perennial streams are gone; lowlands have been damaged by debris from the slopes; old irrigation systems have been clogged and put out of use, while floods far away in lowlands and deltas of the rivers rise to higher stages and cause enormous destruction of life and property.

Some students have attributed this disastrous loss of productivity, and desiccation, to adverse climatic change. But throughout northwest China I found temple forests as green emeralds in ugly settings of gully-riddled landscapes, reproducing themselves naturally in the present prevailing climate. In several remote areas I found the diabolic process at work where a virgin forest was being cleared, not for timber, but to get at the soil for food production. The deep soils were sowed to crops; soil erosion soon destroyed the fruitfulness of the sloping lands.

In spite of this vast destruction by increased populations hard pressed for food, the Chinese in the alluvial and rice growing areas are the world's best farmers. For 6,000 years they have farmed these lands which still produce four crops and more yearly. In west and south China, especially, they have level terraced all slopes by infinite labor and patience, and have shown what good stewardship of the land may be.

During five expeditions into North China prior to 1927, my experimental studies determined for the first time comparative rates and amounts of run-off and soil erosion from land within temple forests and adjoining like areas which had been cultivated and denuded. We found that often sixty times as much water, in the form of liquid mud, flowed from cultivated and barren areas as from the forest. The run-off from the latter was scarcely discolored, showing little or no erosion, while the storm run-off on denuded areas tore away the soil, causing permanent loss to the land.

On the basis of these measurements of widespread soil loss by erosion, my estimate is that soil has been removed to an average depth of from twelve to eighteen inches from hundreds of millions of acres of sloping lands in northwest China by man-induced erosion. By such diabolic processes areas formerly capable of supporting great populations in prosperity, now provide meagre existence for lesser numbers.

Until very recently, the desiccation and torrential flooding of inhabited areas was considered an act of a Supreme Being. That man may be a decisive factor to so-called vagaries of many natural phenomena is a recent conception. The rapid growth of this idea may be partly attributed to the fact that America has developed desiccated and unproductive lands more rapidly than ever before in the history of the world. Effects have followed so closely on the heels of causes that the reasons are glaringly obvious to students of land problems. Striking transformations have been visible to eye witnesses within a single generation. We have come to know soil erosion for what it is.

The exploitation of great areas, whether in America, Africa, Australia, or elsewhere, where farmers and stockmen have cleared and grazed new lands at a rate hitherto unknown, tell the same story. Within the memory of the present inhabitants of certain portions of the world, men have witnessed the transformation of fertile plains from luxuriant vegetation, into barren windswept desert-like lands, periodically whirling blizzards of fine soils to parts

unknown, and leaving behind sandy hummocks. Stockmen tell of grazing paradises, which within their day have been depleted of vegetation and gouged with gullies. People who paid taxes for the building of irrigation dams and reservoirs have already seen some of them abandoned and useless, while other reservoirs are silting up at an alarming rate.

The vast virgin forests of all these newly exploited continents have largely disappeared under wasteful exploitation. It has been annihilation rather than rational cutting with a planned maintenance of the forest for permanent productivity, and for the control of erosion and flashy storm run-off. In a few countries such as Germany, Italy, and Japan, a high conception of the permanent value of natural resources for future national greatness has been developed as a vital policy of national planning. Germany and Japan are exemplary in forest and land conservation. Italy is rushing her program of conservation and reclamation as a basis for a greater empire.

Fortunately, though belated, a national movement for soil and water conservation has been initiated within the past few years which has aroused the American people to the menace of soil erosion. This enemy of civilizations had already destroyed or seriously impoverished 282,000,000 acres of American lands and impaired the productivity of 775,000,000 acres more. As a result, the United States has begun the largest and most comprehensive movement for soil and water conservation in the history of the world. But only a beginning has been made; it must be continued and enlarged.

If a nation would project itself into the future it must protect its lands from the ravages of soil erosion. When lands are impoverished, peoples lower their standards, both physically and spiritually. Soil erosion expresses itself as a deficiency disease of the land which begets deficiency of food, vitality, and higher values for peoples and nations.

As we travel through those lands which have been farmed for centuries, and over which destructive armies have marched and nomads have run their herds, where peoples have risen to varying degrees of culture and have been thrown back again to primitive conditions, we are deeply moved by the futility, wastefulness and ineffable sadness of man's effort to adjust himself to the land. Everywhere in the ancient home of mankind one sees decadence, ruins, fragments of a greater past. It is an arresting tragedy. How can we make peoples realize that present day agricultural operations have everlasting significance for present and succeeding generations?

Soil erosion, the destroyer of land, has been diagnosed; its processes are known and its control is possible. The hope for the future lies in a realization that man has an obligation born of a higher economics, a moral obligation to bountiful Mother Earth which must nourish all present and future human beings as long as it lasts. It is nothing short of criminal for individuals of one generation to sacrifice the right of future man to survive because of traditions of special privileges to exploit the earth. The present and future well-being of a people calls for long range policies for the maintenance of productive lands and resources. These policies must be founded on what is right for the greatest number of people in the long run. It becomes a matter of social economics and national ethics. Practices of land use which work against the good of the whole must be regulated, whether by law or public opinion, to achieve a dual purpose: to maintain individual initiative, and to safeguard the integrity of resources.



Exploitation is self limiting and suicidal. It uses up the principal and makes no provision for future balancing of the national resources budget. Finally when a nation is reduced to desperation to supply food for its people, it will go to an expense far beyond any tax burden yet known to cultivate diminishing soils. Rock wall terraces in old lands prove the Herculean labor and expense to which people will go to maintain a food supply; the cost of such terracing of steep lands would amount to several thousand dollars per acre at labor wages today. Yet such works were carried out to survive. The economics of survival prevailed.

Land thus becomes, not a commodity, but an integral part of the corporate existence of a nation, even as its people. This principle justifies the safeguarding of soils and the restoration of denuded areas on a basis of nation-

Each nation today needs to have many a Moses of land conservation, to instill in the national consciousness the principle of an Eleventh Commandment to regulate man's relation to the holy earth as a faithful steward, to conserve its productivity from generation to generation. Then fields will be protected from soil erosion, water brooks from drying up, and hills from overgrazing by herds, and future generations may be assured of abundance forever.

With the recognition of man's moral obligation to Mother Earth, each nation must assume the responsibility of taking over the reclamation of wasted heritages by unfaithful stewards whose lands have become sterile stones and riddled with wasting gullies, and by intelligent land use bring them back to productivity as much as possible. When its resources are fully husbanded in the advanced



And this desolate scene near the ruins of Timgad, in North Africa, where the small flock appears to be eating rocks, vividly portrays the result of ignoring the warning in the last clause of the Commandment: "... If any shall fail in this stewardship of the land, thy fruitful fields shall become sterile, stony ground and wasting gullies, and thy descendants shall decrease and live in poverty or be destroyed from off the face of the earth"

al ethics and national economy. Economic considerations of today must be shot through with economics of a higher order to meet problems of sustained land use constructively for generations to follow.

Thus for the very endurance of civilization, an ethical approach to land use as a trusteeship, to be used and handed down in a productive condition to succeeding generations, becomes imperative. Man expresses his moral obligation to posterity as surely through the earth as through his social institutions. The fertile or sterile lands which are passed on to feed future civilizations are, apart from blood descendants, our most direct link with the future. The ethical motivation identifies the interests of the individual with those of one's own family of today and tomorrow, outward through local groups to the nation, and eventually to mankind. It draws support and depth from experiences of the past to long range vision and conservation for the future.

JANUARY, 1940

knowledge of full conservation, the possibilities of the earth for increased populations are far beyond the imagination of mankind in general. If the vast energies of the human race could be directed toward a goal of conservation instead of destruction and despoliation, the good earth would respond with abundance of food for all.

Only by conservation in the fullest sense, of the basic resources of land, water, and the spirit of peoples, can we maintain the human values of wholesome standards of living, opportunity, freedom, justice, and faith in the destiny of our modern civilization. Only in conservation have we the assurance of continued progress in the search for that something which has led humanity out of the stone age to a modern mechanical age of development. Only by conservation can we be led on to a higher spiritual and physical development which will express itself in stewardship of the earth for the well-being of humanity for all time.

# "BLACK BOOTS" OF THE

By STANLEY P. YOUNG

TO THE few who have been fortunate enough to have seen this little animal in the wilds, it appears to be wearing a pair of midget black boots on its forefeet. Hence its common name, the American or "black-footed" ferret, and its scientific name, *Mustela nigripes*, meaning black foot. One of those mammals that may be said to bear no resemblance to any other American species, its nearest relative being the wild ferret of Siberia, the distinctive American ferret may possibly have come to our western United States over an ancient Alaska-Siberian

Shortly after Audubon told the scientific world about this black-footed creature, there arose much controversy, insinuations, and finally the questioning of the veracity of certain naturalists. This fact, among other things, is what makes the little animal so interesting and, as will be noted later, is possibly one example of an answer to the old adage "there is nothing new under the sun."

Following his description of the ferret in 1851, Audubon used the Culbertson specimen as a model for one of his celebrated color plates. After this, several years



These rare and unusual photographs show "Black Boots" of the prairies—characteristically inquisitive but the very soul

land bridge, both the Siberian and American forms evolving from a common ancestor.

The renowned Audubon, in 1851, first described this exceedingly rare, secretive, and elusive creature from a single specimen obtained on the lower waters of the Platte River near old Ft. Laramie, in Wyoming. This specimen was obtained from Alexander Culbertson, a leading fur trader who at the time had succeeded Kenneth McKenzie in charge of all the Northwestern fur trade. Audubon had made the acquaintance of Culbertson in 1842 when the latter was in charge of old Ft. Union on the Missouri River.

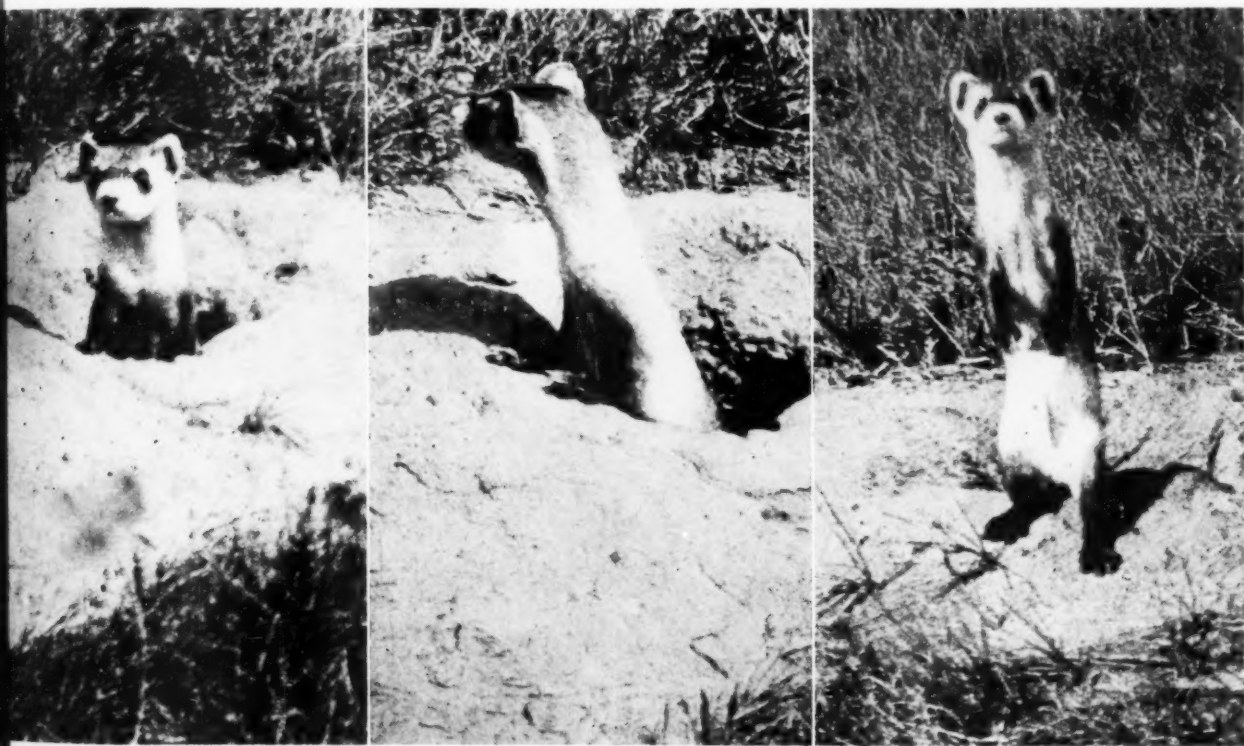
elapsed before mention was again made of the animal. This time it was by Professor Spencer F. Baird in his *General Report on North American Mammals*, published by the Smithsonian Institution in 1857. He wrote: "Indeed, the only one known is that figured and described in the North American Quadrupeds of the above-mentioned authors (Audubon and Bachman) and collected by Alexander Culbertson on the lower waters of the Platte River." Baird accepted Audubon's description and drawing of the animal and the fact of its occurrence in America, as did several other contemporary American naturalists of the times.

# PRAIRIE

- The Rare American, or Black-footed Ferret, Subject of
- Much Controversy Following Its Discovery by Audubon
- Eighty Years Ago, Still Remains a Mystery to Biologists

After Baird's comments, however, nearly a quarter of a century passed during which no other specimens were obtained, nor was the animal observed in the wilds. As a result there gradually developed a feeling that Audubon's description and the purported existence of this weasel-like animal was a myth. Controversy became rampant and the more it raged the more the validity of the animal's existence was questioned. Particularly was this true of some of the leading British scientists prominent in the field of natural history during the middle of the

exception of Audubon, ever mentioned such a creature. Someone said: "It is a little remarkable that so conspicuous and well marked a species should have eluded the notice of all recent explorers in the Platte region." Consequently, if one bears in mind that, from approximately 1820 on, the foundation of much of the natural history in North America was being laid, and further that many mammals new to science were being observed and described, there was good cause for the controversy as to the real existence of the mammal when only one speci-



of caution and alert to every sound—emerging slowly from a prairie dog hole on the Crow Indian Reservation in Montana

nineteenth century. In fact, Audubon was accused of having "invented" the existence of the black-footed ferret "to embellish his work."

The specimen that Audubon obtained from Culbertson had apparently not been viewed by any other naturalist, and its loss shortly thereafter seemed to add more fuel to the controversial fire. Then, too, the naturalists of the period from 1860 to 1870 could not comprehend the fact that the earlier explorers of the West, Lewis and Clark, Long, the naturalist Say, and others, made no mention of having seen or obtained a specimen of this animal. Nor had any other traveler before 1875, with the

men had been described by one naturalist, and that specimen had shortly afterwards become lost.

As the controversy continued, Dr. Elliott Coues, a leading American scientist of the times, and one well versed in the natural history and topography of the West, vigorously took up the defense of Audubon's black-footed friend. In 1874 he issued a call for specimens through the columns of the *American Sportsman*, one of the leading magazines of its kind in the country, and in other sporting journals. Coues mentioned that a fragment of skin "lay unrecognized in the National Museum" consisting "of a squarish piece of skin of the lower back, with tail



attached," but he apparently did not then associate this fragment with the animal in controversy. In a short time, however, Coues' efforts in the defense of Audubon were rewarded by his obtaining and viewing a number of specimens of the black-footed ferret taken in the far West.

From the foregoing, the reader may well wonder what this so-called "black boots" looks like. The illustrations appearing on these pages are the answer. This sequence of photographs of one and the same animal is believed to be the only one of its kind ever taken of the black-footed ferret in its native habitat. It was made in Montana during the summer of 1927 by Edward C. Cates of the Biological Survey.

What are the habits of this animal? Strange to relate, little is actually known concerning it. Facts concerning its traits, breeding habits, number of young, time of birth and so on are today as much in the "dark" as are its front feet. In many respects our present lack of knowledge of its natural history is comparable to the argument concerning its existence that prevailed until Elliott Coues brought out the facts that resulted in acceptance of the species by naturalists.

Its range is definitely known to cover the Great Plains from western North Dakota and northern Montana, south to Texas, and thence westward through New Mexico to the country north of Williams, Arizona, to the southern rim of the Grand Canyon which to date appears to be its most westerly known habitat. The black-footed ferret is about two feet in length, nearly the size of a pine marten, our so-called American sable. The female is approximately an inch or two smaller in size, but otherwise resembles the male. Its forehead, part of the legs and feet are very black, and the body, which is rather lithe and weasel-like, is dun colored on the back and sides, shading off to a dull white on the belly. The toes, which extend from rather blunt legs, are exceedingly stout with sharp nails. With such leg structure the feet are apparently not much used for digging. That this may be true is indicated by the fact that rather coarse hair covers the feet, including the soles, a rather rare hair development in mammals.

The face of the ferret has a distinct mask, formed by very dark hairs that encircle the eyes and extend a short distance along its nose. This species has probably the strongest shoulder muscles of any of the weasel family. It is, like the weasel, a great wanderer, for it has been taken in the Rockies at elevations between 9,500 and 10,500 feet.

The ferret is very inquisitive. It will invariably stand upon its hind legs when cautiously approached, turning its long neck in various directions as if to obtain a better look at the strange object arousing its curiosity.

While it has been observed occasionally in daylight, its search for food is made chiefly at night, thus making it mainly nocturnal. This may be one of the chief reasons why it evaded the notice of the early pioneer naturalist-explorers of the West for such a long period. Nor does this diminutive creature appear to have been at all numerous at any time anywhere throughout its range. Almost invariably associated with prairie dogs, the ferret is one of the principal enemies of these rodents, which are one of its preferred foods. In its movements from one prairie dog hole to another, it is grace personified. It is known to feed also on rats, field mice, rabbits, and ground squirrels, as well as on birds' eggs whenever found. Like most of the smaller plains mammals, the black-footed ferret lays up throughout parts of the winter in some abandoned prairie dog hole, or one it has appropriated to itself.

The ferret is scrappy and exceedingly ferocious for its size, though when taken very young it makes an interesting pet. A full-grown adult has the bite of a mink and the tenacity of a bulldog. A newly captured animal, on being irritated, emits a series of spits and hisses similar to those of a cat. A specimen taken near Greeley, Colorado, early in 1920, was covered from its ears to near the end of its tail with a profusion of ticks. The disease tularemia, a known factor in decimating rabbits, ground squirrels and prairie dogs, as well as sylvatic plague, also found in prairie dogs and ground squirrels, may be potent factors in keeping down ferret abundance. This is another one of those unknown quantities as far as it affects our American wild ferret.

Because the ferret seems to prefer to live in prairie dog towns, the student of natural history surmises that the inevitable removal of the prairie dog from much of the plains area because of agricultural practices may eventually drive this animal from much of its former domain. This is far from being an established fact, however, because of insufficient data. The ferret is a great wanderer, and this coupled with the fact that it lives on other mammals and on birds' eggs may enable it to cope with man's increasing disturbance of its habitat. It may now be more of a mountain than a plains dweller. New Mexico has recently passed an act providing for the protection of certain fur animals, including the black-footed ferret. *Mustela nigripes* has its place in American natural history. It has had the distinct honor of being one of the few American mammals that has kept American naturalists on their toes in defense of their claims of its actual existence under the western prairie sun. Because of its rarity and also because it once caused a scientific controversy, the black-footed ferret's profile was adopted by Dr. C. Hart Merriam, founder and first chief of the Biological Survey, as the insignia to be placed on each of the Survey's fifty-six North American fauna publications.

It is now more than eighty years since Audubon first described this plains denizen, and more than sixty years since Coues so ably defended the veracity of Audubon. Study specimens now recorded in the leading museums of the United States continue to place the animal in the rarest of categories. Ernest Thompson Seton, in his *Lives of Game Animals*, says: "In the American Museum of Natural History are five examples, one a useless zoo skin, three good specimens. In the Field Museum there are no specimens. In the Colorado Museum at Denver there are six specimens, three of them mounted." In the combined study collections of the federal National Museum and the Biological Survey are sixty specimens, probably the most representative collection in the entire world. The first one acquired by the Biological Survey was on November 23, 1889, from Trego County, Kansas, and that by the National Museum on October 10, 1884, from the same locality.

Considering its immense available range, its seemingly abundant food supply independent of that furnished by the diminishing numbers of prairie dogs, the scarcity of few apparent enemies, and the fact that it can handle itself well on defense, what has made the diminutive "black boots" so rare during the eighty-odd years it has been known to science? There are hundreds of guesses. The answer, however, still awaits the scientific determinations of some student of natural history sufficiently trained to evaluate properly the facts developed by painstaking field studies. In the meantime, those other western states fortunate enough to have the black-footed ferret within their borders might well follow the example so admirably set by New Mexico. "Black Boots" is in a class by himself amongst our small American carnivores.





A Japanese chestnut "mother" tree, one hundred years old, on a Pennsylvania farm. The nursery seedlings in the background are her progeny

## ASIATIC CHESTNUTS AS FOREST TREES

By JESSE D. DILLER

LONG before our American chestnut, *Castanea dentata*, was doomed by the chestnut blight, European and Asiatic chestnuts had been introduced into the United States for orchard and ornamental purposes. There was at that time no incentive to grow exotic chestnuts for timber production since our native species served that purpose well. The Asiatic chestnuts imported prior to 1900 were mostly the Japanese species, *Castanea crenata*. Soon after 1900 the Chinese species, *Castanea mollissima*, was also imported. Before the enactment of plant quarantine laws great numbers of both seed and planting stock were brought from the Far East and with them came the chestnut blight fungus, *Endothia parasitica*. With its rapid spread during the past generation our native American chestnuts as well as most of the imported European varieties have been destroyed by this introduced disease.

For many years the Bureau of Plant Industry has been evaluating chestnut seedlings, sprouts and trees of

American and European origin whose apparent resistance to the chestnut blight fungus has been reported. Wherever these supposedly resistant trees have been under observation for a sufficient period, they have ultimately succumbed to chestnut blight. It is possible that a blight-resistant American chestnut tree may yet be developed as a bud variation or a sport. For that reason all seedlings or sprouts reported as being resistant are carefully watched. Seedlings are being grown from many of these supposedly resistant trees, but experience over a number of years has been discouraging. It seems doubtful whether any native seedlings of outstanding value will be found. Pollen from some of these supposedly resistant trees has also been used in extensive chestnut breeding experiments carried on for years by the Division of Forest Pathology. In these experiments all available American, European, and Asiatic species of chestnuts and of chinquapins have been used. This office has also partially supported the Brook-

lyn Botanic Garden in similar breeding work.

In 1908, on the basis of inoculation studies and field observations, the Bureau of Plant Industry first reported that the Japanese chestnut was naturally resistant to chestnut blight. This discovery offered the first clue to the original home of the disease and aroused interest in the Asiatic species as a possible substitute for the susceptible native and European species in the United States. In 1913, Frank N. Meyer, Agricultural Explorer for the Bureau of Plant Industry, collected the chestnut blight fungus in China, on native Chinese chestnuts, under conditions which indicated that it was indigenous there.

Until the present decade Asiatic chestnuts had not been tested as forest trees in the United States. Large numbers of Asiatic chestnut trees of the orchard type, ranging from twenty-five to forty years and several of Japanese origin between fifty and 100 years of age, are growing in blight-swept areas of the eastern United States as far north as Michigan and as far south as Alabama. They occur singly, in groups or in orchards. Anyone who has seen Asiatic chestnut trees growing in these eastern states may question their potential forest value. One may be especially sceptical as to the ability of Asiatic chestnuts to maintain themselves under our "wild" or forest conditions because of their apparent slow growth. A prejudice has also developed against them as forest trees, because of published statements to the effect that Asiatic chestnuts seldom grow more than forty feet high. In contrast the concise, descriptive field notes of explorers in Asia and the botanical manuals of the regions show that Chinese and Japanese chestnut trees sometimes attain maximum heights of sixty and ninety feet, respectively, with diameters of two to three feet.

The older plantings of Asiatic chestnut trees in the eastern United States were in open situations to insure early fruiting. Under these conditions the Asiatic chestnuts naturally developed low-spreading crowns, but when grown under forest conditions there are indications that at least one Chinese "orchard" strain will assume forest tree form. These trees were planted extensively throughout the eastern United States in the spring of 1926. Thus far they have competed successfully with associated tulip poplar, black birch, red oak and other volunteer hardwoods which were seedling-in when the two-year-old chestnuts were planted. Several of these chestnuts made an average yearly height increase of two and one-half feet and an average yearly diameter increase of three-tenths of an inch at breast height during the first fourteen years. Whether they will continue to compete successfully with rapid-growing native broadleaf species remains to be seen.

As is to be expected from seed originating in various regions in Asia, the orchard-type chestnuts planted in the eastern United States have responded differently to their new environments. Some have made poor growth and have proven rather susceptible to blight. Others have attained considerable size, have shown resistance to the blight, and appear to be well suited to their environment. This is evidenced by volunteer seedlings found growing near Asiatic parent trees. The tallest volunteer seedling was found near Doylestown, Pennsylvania, and is thirty feet in height. In several cases the owners, in addition to marketing the nut crops locally, have established successful nurseries with nuts produced by their Asiatic chestnut trees. The largest of these trees found growing in the eastern United States are Japanese and measure from three to three and one-half feet in diameter at breast height and are fifty feet in height.

About fifteen years ago the interest in and the need for resistant forest-type chestnuts became so great that the Bureau of Plant Industry undertook an investigation.

From 1927 to 1930 an expedition explored the forests of Japan, Korea, and Formosa for blight-resistant chestnut trees that might be suitable for the production of timber, poles, posts and tannin in American woodlots and forests. About 250 bushels of seed from native strains were obtained. Arrangements were also made for subsequent shipments of nuts from various, sometimes remote, districts of Japan, China, and Korea. The imported chestnut seed were planted in the Bureau's nursery at Glenn Dale, Maryland, and in 1930 the first seedlings were available for distribution.

Beginning in 1930 and in each successive year thereafter seedlings have been distributed to federal, state, and public agencies, until 275,000 seedlings have been used for forest plantings alone. These are in an area from the New England States to Iowa and south to Florida and Texas. A few Pacific Coast plantings have also been made. More recently in cooperation with several federal bureaus and with state game commissions, Asiatic chestnuts have also been planted experimentally on game refuges to determine their possibilities as a source of food for wildlife. Distribution of these forest chestnut seedlings is now confined to federal or state agencies. Some state foresters and game departments are now growing Asiatic chestnuts in their forest nurseries for distribution within the state. A list of some private nurseries offering Asiatic chestnut plants and seed for sale is available, upon request, from the Division of Forest Pathology of the United States Department of Agriculture.

At first the sites available to the cooperators for chestnut afforestation consisted mostly of worn-out eroded land or unproductive dry grassy areas. No doubt this course was followed because of the meagre knowledge of the silvicultural requirements of Asiatic chestnuts. As a result the sites chosen represented many combinations of elevation, gradient, ground cover and soil—mostly unproductive. The results show that, although Asiatic chestnuts planted on unproductive soils may persist for years, the branches and current-year shoots usually die back. Eventually if the trees do not succumb, they become so stunted as to promise little future value. Naturally, such weakened Asiatic chestnut trees are more susceptible to infection by twig-blight and chestnut-blight fungi. In a few cases the planted Asiatic chestnuts made slow growth for the first four or five years apparently because the sites were poor. Then the chestnuts recovered from their stunted condition and began making rapid growth. At about the same time native woody shrubs and trees seeded-in, indicating that the site had improved.

Tests of numerous forest strains of Asiatic chestnuts indicate inherent differences in their silvicultural requirements. Certain strains appear somewhat less exacting as to soil conditions than others, but, in general, it is clearly apparent that Asiatic chestnuts should be planted on soils of average or better than average site quality. It follows that before passing judgment on the merits of Asiatic chestnuts, an appraisal is needed of the site upon which the trees were planted. The "yellow poplar" type of the central forest region of the eastern United States appears to be well suited to the growth and development of Asiatic chestnuts. In the coastal plain region of the Atlantic and Gulf states, "second bottoms," "beech hills" or "river terraces," normally support those mesophytic broadleaf species, whose moisture requirements fit in with normal conditions in the temperate regions. These locations appear to offer the best sites for the Asiatic chestnuts. Steep hillsides with rock outcrops but fertile soil, however, are suitable places for testing Asiatic chestnuts. Like tulip poplar and red oak, Asiatic chestnuts are regarded as intolerant, requiring some direct sunlight for

best development. Protected sites facing north are to be preferred to those exposed to the south or southwest. Chestnuts should not be planted in "frost pockets" or on soil that is poorly drained. Fire, browsing animals, and drought have also been responsible for the loss of thousands of experimental trees.

The high cost of the imported seed, the expensive planting stock, and the probability of their failure prohibit further planting of chestnuts on poor sites. Future experimental forest plantings of Asiatic chestnuts should be on small, well-chosen sites, rather than in solid blocks on poor sites. The object should be to get optimum development so as to afford a true basis for judging the value of the trees rather than to determine how poor the sites may be for chestnuts to grow.

Numerous small experimental forest plantings throughout the eastern United States on specially selected sites where the Asiatic chestnuts can be ex-



R. Kent Beattie

In Korea — this Asiatic chestnut has a breast-high diameter of forty-two inches and is sixty feet high. It is capable of producing a log twenty-five to thirty feet long. The tree bears annual nut crops

pected to thrive, deserve further trials. They should be on rich soils, well supplied with moisture and well drained, but extensive forest plantings of Asiatic chestnuts with the purpose of replacing our blight-killed native chestnut are out of the question. Such an effort is unwarranted because the numerous strains of Asiatic chestnuts have not been sufficiently tested. Also, as has been observed, the blight-killed American chestnuts were almost immediately replaced by native oaks and other trees without serious understocking. Asiatic chestnuts for forest or farm woodlot are most likely to succeed when planted under openings in the forest canopy around freshly cut stumps immediately following selective logging, on skidways which need not be kept open for future use, along the edges of woods, on abandoned fence rows, or on retired agricultural land whose high fertility level is evidenced by the presence of  
(Continuing on page 45)



Japanese chestnuts after ten years' growth at an elevation of 3,640 feet in the Southern Appalachian region. American chestnut, red oak, tulip poplar and black birch had been logged shortly before the Asiatic chestnuts were planted



George C. Chew

Under good management, enough timber has been cut and sold from Seattle's watershed forest to retire all of its debts and to pay its operating expenses. Above is shown a freshly logged and slash burned area near Cedar Lake

## THE LARGEST COMMUNITY FOREST

**The 66,000-Acre City Forest of Seattle is Not Only the Largest in America,—Probably in the World, and Under Good Management is Paying Its Way**

**By WYMAN SMITH**

Photographs by courtesy of Seattle Water Department

WHEN the City of Seattle set out in 1900 to acquire control of the Cedar River watershed in order to protect its city water supply, there were those who said that the watershed contained enough good timber to pay the cost of purchase—and more.

Quite naturally Seattle was somewhat skeptical, but like other American cities it took a chance. As a result, according to Allen E. Thompson, forester for the Cedar River Watershed, Seattle today has a forest which has paid back to the city nearly a million dollars, or enough to retire all debts with a sufficient surplus to take care of all expenses. Out of a gross area in the watershed of more than 91,000 acres, the city now has title to 66,300 acres of land, giving it the largest community forest in the United States and, so far as is known, in the world.

The Seattle watershed contains about 48,000 acres of virgin timber, 29,000 acres of cutover land naturally re-

foresting, 4,300 acres of planted land, 4,000 acres of open or waste land in need of planting, and the remainder in alder and maple, water, rock slides, and similar areas.

Up to December 31, 1938, the Seattle community forest, according to Mr. Thompson, had yielded more than 274,000,000 board feet of fir timber, 120 million board feet of hemlock, pine and larch, 26,000,000 feet of cedar and spruce, and 276,000 feet of piling, or a total of more than 422,000,000 board feet of stumpage which were sold for \$885,000. Under contract made in 1917, timber is now being cut to a minimum of twelve inches in diameter on twenty-four-foot logs. And nearly 8,000,000 board feet were sold in 1938.

Originally, of course, Seattle planned only to obtain the land on the watershed in order to protect its city water supply, but it has since discovered that its forest, like most other forests, if properly managed has many



uses and can serve many purposes. For example, in addition to showing the possibilities of producing timber crops for revenue, or in demonstrating good forest practices, Seattle's community forest is opening up new areas for fish and game management.

As one of the first laws of good management is adequate fire protection, the fifty-three miles of roads in the forest are used for that purpose. Two fire lookout towers have been erected and guards are stationed in them during the fire season. Fire guards are also on the job at the forest's nursery at Cedar Lake. As a result, there were only nine fires in 1938, burning over an area of about seven and a half acres—a record to be proud of. To make certain that pollution of the water in the area does not occur, four sanitary patrolmen are always on the job.

The city's forest nursery at Walsh Lake contains about two and a half acres of good growing land with an annual capacity of around 400,000 trees, of which approximately ninety-five per cent are Douglas fir. Most of the seedlings planted are two years old.

Between 1925 and 1938 about 4,000,000 young trees were planted on the watershed, covering a total of 4,300 acres. All of these seedlings were grown in the forest's own nursery with the exception of about 60,000 trees which were obtained from the nursery of the federal Forest Service at Wind River, Washington, in 1925, the first year of planting.

The Seattle watershed forest is definitely a going concern. Says Forester Thompson:



George C. Chew

Fifty-three miles of roads have been constructed in Seattle's community forest for logging purposes and for adequate forest fire protection. How effective this and other measures are is indicated by the fact that but seven acres were burned over in 1938. Above, twenty-five year old Douglas fir along one of the roads, while below is shown a twenty-year old stand holding the snow that will later become Seattle's water

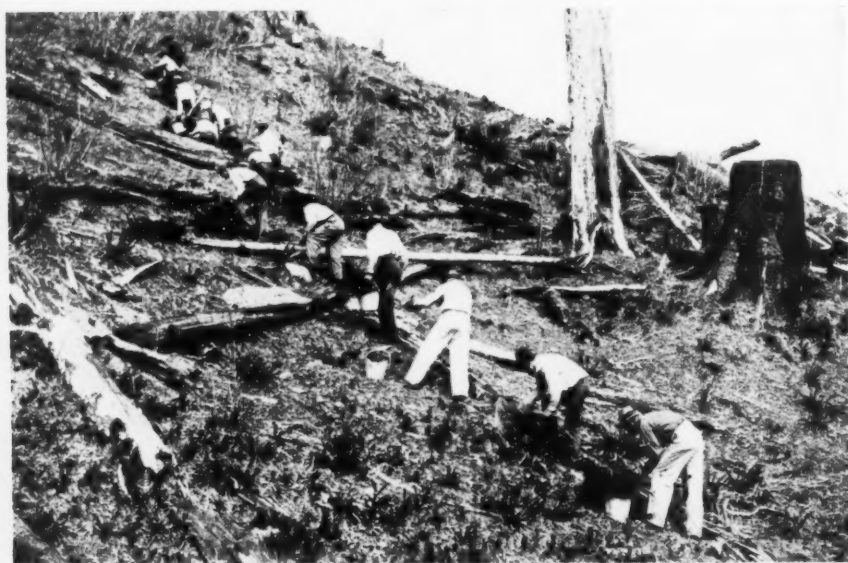


Allen E. Thompson



George C. Chew

One of the two fire lookout towers which guard Seattle's forest of fir



George C. Chew

Four million young trees have been planted on waste or burned over land



George C. Chew

The Walsh Lake nursery grows nearly a half million seedlings a year

"Fifteen years of improvements and forestry operations have had their effect. A large percentage of the burned and re-burned areas of previous years has been reforested by planting. Adequate forest fire protection has preserved the growing young forest which has become established on old cutover lands, and on the more recently logged areas natural reforestation has proceeded without the destructive influence or devastation of fire."

Mr. Thompson's appraisal might be called conservative, for the second growth forest that is now coming in on cutover lands is already large enough to provide good cover for watershed protection. And, it is to be remembered, younger and newly established forests are being extended.

It is estimated that in fifteen years practically all of the 38,000 acres of cutover lands in Seattle's watershed will be covered with splendid second growth—a forest which will protect the water supply and at the same time will develop into a valuable timber asset. In fact, when the growing stock reaches its maximum capacity, Forester Thompson estimates conservatively that the annual cut will be about 48,000,000 board feet on a ninety-year rotation, and that the annual net return from forestry operations will reach \$150,000.

For a good many years the city of Seattle has shown a profit on its water system of \$100,000 or more after providing for all operation, maintenance, depreciation, charge of interest on funded debt, and city and state taxes. Yet the water rate is low, and the city water system boasts the lowest bonded indebtedness by far of any other water utility on the Pacific Coast of similar importance. A peak consumption of about 110,000,000 gallons of water a day and an average consumption of about half that amount is easily supplied. The water flows clear and pure from the forested slopes, rates very low in "soap-consuming" power, and is definitely "soft."

So Seattle has soft water from a forest that is a hard fact and yields real money. America's largest community forest is off to a fine start.

AMERICAN FORESTS



R. H. Ober

Properly managed and given fire protection, the Douglas fir forest will come back, as these pictures so eloquently testify. Above, desolation on the Seattle watershed following a fire in 1911—below, the same scene in 1939 after eighteen years of protection



George C. Chew



# PROGRAM

## SIXTY-FIFTH ANNUAL MEETING OF THE AMERICAN FORESTRY ASSOCIATION TO BE HELD JOINTLY WITH THE MISSISSIPPI FORESTRY ASSOCIATION, AT BILOXI, MISSISSIPPI, FEBRUARY 1, 2 AND 3, 1940

HEADQUARTERS—THE HOTEL BUENA VISTA

The following program for this joint meeting on the delightful Gulf Coast of Mississippi is still tentative and subject to revision since acceptances have not been received from all speakers listed. Members planning to attend are urged to make reservations as soon as possible inasmuch as the Mardi Gras opens in nearby New Orleans the first week in February and good hotel accommodations may not be available unless arranged for well in advance. Rates, as previously announced, are \$5 a day single and \$9 a day double, American plan—\$3 and \$3.50 single and \$5 double, European plan. Reservations should be made by writing The American Forestry Association, 919 17th Street, Northwest, Washington, D. C.

### THURSDAY, FEBRUARY 1

#### MORNING SESSION—9:30 A. M. Buena Vista Hotel

Welcome—Henry Crosby, President, The Mississippi Forestry Association

"Potentialities of a Farm-Forest Economy in the South."

James G. K. McClure

President, The American Forestry Association

"Forest Resources of the South and Their Industrial Significance"

I. F. Eldredge

Director, Forest Survey of the South, United States Forest Service

"An Appraisal of the Fire Drain on Southern Forests"

Frank Heyward

Director, Southern Pulpwood Conservation Association

#### AFTERNOON SESSION

Motor Trip along historic Gulf Coast to forest properties of Weston Lumber Company where a typical southern barbecue will be held and selective cutting operations will be shown.

#### EVENING SESSION—8:00 P. M. Buena Vista Hotel

"Water and Soil Conservation Problems of the Lower South"

H. G. Meginnis

Southern Forest Experiment Station.

"Drama of Civilization as Told by the Land"—An illustrated talk based upon fifteen months of study of land use in the Holy Land and other old countries of the world.

Dr. W. C. Lowdermilk, United States Soil Conservation Service

### FRIDAY, FEBRUARY 2

#### MORNING SESSION—9:30 A. M. Buena Vista Hotel

"Mississippi's Forest Program"

Henry Crosby

President, The Mississippi Forestry Association

"Forests in a Land Use Program for the South"

M. L. Wilson

Assistant Secretary, U. S. Department of Agriculture

"Industrial Research as a Market Finder for Wood"

L. F. Livingston

E. I. du Pont de Nemours and Company

"Business Aspect of Forest Management in the South"

Ernest L. Kurth

President, Southland Paper Mills, Inc., Herty, Texas

#### AFTERNOON SESSION

Field trip by motorcade through interesting forest sections of southern Mississippi, visiting the Biloxi Unit of the De Soto National Forest, including the Biloxi Recreational Area and the Harrison Experimental Forest, where experiments are under way in forest fire prevention, forest stand improvement, relation of birds to yellow pine, control of the rust canker, etc. Also demonstrations of organized fire protection by the State of Mississippi, a visit to a live oak grove in which the famous Ruskin Oak stands, and other points of historical and forestry interest.

#### EVENING SESSION—Annual Banquet, 7:00 P. M. Buena Vista Hotel

### SATURDAY, FEBRUARY 3

#### MORNING SESSION—9:30 A. M. Buena Vista Hotel

"Can Private Forestry Pay Its Way in the South?"

W. M. Oettmeier

Manager, Superior Pine Products Company, Georgia

Leslie K. Pomeroy

President, The Ozark Badger Lumber Company, Arkansas

"How Can State Forest Departments Be Strengthened?"

O. E. Siecke

State Forester of Texas

H. A. Smith

State Forester of South Carolina

Round Table Discussion

#### AFTERNOON SESSION

Choice of (1) Boat Trip to Ship Island, site of old Fort Massachusetts, or (2) Motor Trip to the famous Bellgrath Gardens near Mobile, Alabama, with a stop en route at Moss Point, where diversified products from pine and pulpwood are made.



# EDITORIAL



## FORESTS AND NATIONAL DEFENSE

IN Mr. Coleman's article, "Wood in Modern Warfare," a line from a German paper is quoted. It reads, "To be without wood in time of war is almost as bad as being without bread."

America gives no such high rating to wood. This doubtless is because our people have never felt the pinch of forest shortage either in peacetime or wartime, and therefore have given little thought to the extent to which modern warfare depends on wood and its diversified products. Mr. Coleman's article, it is to be hoped, may awaken thought along this line by the timely emphasis it places upon the importance of forests in a program of national defense.

Congress will have that question before it at its coming session. Whatever program it may provide, the necessity of having always at hand a reserve supply of growing timber should not be left out of account: nor should the necessity of having superior knowledge than our adversaries of utilization processes to the end that wood may serve its highest usefulness as a defense resource.

The former might be provided by a more conservative peace time cutting policy for the national forests and a more unified government policy to aid and encourage industry to engage in the extensive growing of timber on our millions of acres of private land. The latter—leadership in methods of wood utilization—can only be met by adoption of a permanent program of research by industry and government for the development of new and improved methods of utilizing wood.

As pointed out by Mr. Coleman, great progress has been made in the chemical and mechanical fields of wood utilization since the World War. In point of advancement, Germany probably excels all other countries. Certainly she is now reaping great military and economic benefits from the advanced knowledge of wood she has amassed through recent years of intensive research. What is more to the point for us, however, is the fact that wood utilization is still in its infancy and ahead lies a great unknown field of possibilities. Certainly if the time should ever come when we shall be called upon to defend ourselves, as have Poland and Finland this past year, we must not be caught with inadequate knowledge of the full utilitarian possibilities of wood to strengthen our defense position as a nation. This applies not only to military operations but to economic self-sufficiency during prolonged sieges. In modern warfare, the latter may well be the more important consideration.

Provision for adequate supplies of wood and wood knowledge to meet future defense emergencies is not a great undertaking in point of expenditures. It is a minor budget consideration compared to the outlays called for in many other essential defense fields. Indeed a competent peacetime policy of forestry, if based on the principle of making timber growing an attractive enterprise for the millions of people who own forest lands, would amply serve our future national defense requirements and at small cost to the public. And such a policy would promote internal peace by promoting industry, the use of land and capital now idle, and the employment of labor.

Nationally our budget of forest drain and forest growth is not greatly out of balance. In order to increase and build up balances of growing wood in all parts of the country, the fundamental needs are adequate protection against fire and insects of the forests we have growing and an incentive of wood markets to spur owners of millions of acres now idle into the business of timber growing and permanent forest land management. Three great fields of market possibilities await more intensive research to uncover new and improved uses of wood. One is the field of building wood and construction, where wood may be the answer to the nation-wide need for low-cost housing units. Another embraces the problem common to all our forest regions—that of finding utilization outlets for low grade wood and so-called inferior species not now marketable. Approximately one-half of the wood cut to supply present market demands must be left in the forest as waste because of lack of markets for low grade material. The third field is the chemical utilization of wood, the possibilities of which seem unlimited.

These measures can be adequately provided for by the expenditure of a few million dollars more yearly than at present. We have the lands to increase our resources of raw wood tremendously but in doing so we must through research keep utilization markets ahead of timber crop increases or we shall slowly but surely short-circuit forestry by private initiative by making timber growing an unprofitable undertaking for private capital. The alternate course is for the federal and state governments to take over our forest lands and grow timber merely for future surpluses regardless of market outlets. This would be the costly course, both from the standpoint of national economy and the burden of expense it would impose upon the public.



# BOYS AND GIRLS — — DO YOU KNOW ME?

## READ THE VERSE — NAME THE TREE



By RUFUS H. PAGE, JR.

1. Golfers use me every day,  
My bark is brown and rough;  
And if you want to hunt, they say,  
For 'possum, I'm the stuff.

I am .....

2. They say he hanged himself on me,  
Who crucified our Lord,  
And I bear flowers red, you see  
To signify the blood.  
I'm not a very useful wood  
But bear a message fair,  
For when I'm budding full and good  
Spring is in the air.

I am .....

3. I make of dirt more fertile soil  
To ease the farmers' labored toil.  
I hold this soil in place and grow  
Future fence posts, row on row.

I am .....

4. Touch me not if you would be  
Free from hurt — there're thorns on  
me.  
I grow long pods both brown and  
sweet  
From which the school boys often eat.

I am .....



5. I blossom early in the Spring,  
My flowers' red, not blue;  
And when the Autumn Church bells  
ring  
My leaves turn crimson, too.  
And strange to say in summer time  
When Old Jack Frost has fled,  
My twigs that bear my leaves so fine  
Are quite a pretty red.

I am .....



TREES are not so hard to learn,  
They're most like folks, you know,  
Some are gay — others stern  
Like hemlocks in a row.  
Some grow tall and straight and fine,  
Others, gnarled and bent;  
But each serves man, from haw to pine,  
To each, a purpose lent.  
Lines of simple words, you see,  
Will tell you who they are.  
You'll have to guess them, all but three  
To make the course in par.



6. My heart is red, my sap is white,  
My berries, blue—I'm quite all right.  
I last and last when in the ground.  
More handsome wood is seldom found.

I am .....

7. I'm placed on lawns to grace the yard  
And yet my wood's so tough and hard  
That if I grow both straight and clear  
I'll end in textile mills, I fear.

I am .....

8. I'm just about as big a tree  
As grows upon this earth.  
I grow as tall as tall can be  
And have tremendous girth!  
I'm several thousand years of age;  
Grow only in the West.  
I'm of them all the oldest sage,  
My wood ranks with the best.

I am .....

9. My leaves are smooth and olive green.  
I'm hard to split, as you have seen.  
My fruit, a purple berry small,  
Feeds birds and game galore each  
Fall.

I am .....

10. I grow along the sandy coast.  
Large leaves and lengthy cones I  
boast.  
Hard and resinous wood have I  
That many mill men seek to buy;  
And oft they bleed before they fell—  
Now that is all I need to tell.

I am .....



# TURN TO PAGE 46 FOR THE ANSWERS

11. My leaves blue-green, in groups of five

Make quite a pretty tree.  
I'm useful dead, and when alive,  
Attractive as can be.

I am .....



12. My top's a rounded, pretty thing;  
Bark's smooth and mottled gray.  
I grow quite often by a spring,  
You've carved me, I dare say.

I am .....



15. Now I will keep you guessing  
For usually I'm quite small.  
I don't grow very big around  
And not so very tall.  
But in the winter time I can  
Be seen for quite a ways.  
With leaves of green I grace the land  
Through long, cold wintry days;  
And berries red I sometimes grow  
To feed the hungry birds.  
I'm quite a contrast in the snow.  
I'm too dressed up for words.

I am .....

16. For barrels, chairs, and hardwood  
floors;  
For wagons, ties and heavy doors  
My wood is used in all the land  
It seems I'm always in demand.

I am .....

13. In coastal plain I am quite small,  
In mountains, sometimes high;  
But whether low or whether tall  
The bees won't pass me by;  
For in my flowers I produce  
A tasty liquid, fine;  
And though my leaves have sour  
juice,  
My nectar is sublime.

I am .....

14. My sap is sweet, my wood light  
brown,  
I'm found quite oft in rich, wet  
ground.  
My leaves are shaped like stars, you  
know  
And gray-brown, corky bark I grow.

I am .....

18. They call me tough, and this is true.  
My wood is hard, and heavy, too.  
The squirrels, they think I'm pretty  
fine,  
Especially in the winter time.

I am .....

19. My wood is soft and greenish white,  
My square cut leaves bright green.  
I am quite tall, my bark is light.  
On rich, moist soils I'm seen.

I am .....

20. They put me last, but that's not fair  
They say I'm rough, but I don't care.  
My limbs persist in hanging on.  
I'm really not so much for form.  
But fuelwood and pulp I make  
And poor land never makes me quake.  
My seed are numerous every Fall  
And grow if given chance at all.

I am .....



## BALSAM FIR

*Abies balsamea* (Linnaeus) Miller

By G. H. COLLINGWOOD

TYPICAL of cold climates and well drained, moist situations, the arrow-headed spires of balsam fir add a note of deep green to the northern forests. Ranging from sea level to elevations of over 5,600 feet, it grows in New England and Labrador west and north across New York, the Lake States, and Ontario to a few degrees of the Pacific Ocean at the headwaters of the Yukon River. Most important of the two eastern true firs, *Abies balsamea* is one of ten *Abies* native to the United States and Canada. This large evergreen family is characterized by disk-

like leaf scars and erect cones which break apart and leave a woody spike soon after the seeds ripen.

Often associated with red spruce, black spruce, tamarack, and hemlock, occasional pure stands are formed and on drier sites it is mixed with yellow birch, beech, and maple.

Perhaps the most symmetrical of all northeastern evergreens, it averages twenty-five to sixty feet in height and occasionally reaches eighty to ninety feet. The diameters range from ten inches to twenty-eight inches. With maturity, long slender branches devel-

op in somewhat distant whorls and droop as they spread. At high elevations and on wind swept mountain summits dense, dwarfed mats are formed. Capable of enduring dense shade in early youth, it may grow rapidly but shows defects within ninety years and seldom lives beyond 150 years.

The deep blue-green, narrow leaves are about an inch long, and shiny on the upper side. The ends are blunt, frequently indented, conspicuously light colored on the under side and marked near the ends with rows of stomata. Arranged spirally on the twig, they usually part in two ranks like the teeth of a double comb to form a V-shaped depression on the upper side of the twig. The upper crown leaves are short, plump, incurved, and almost erect as compared with the longer leaves near the base. They adhere to the twigs about eight years and furnish winter food for deer and moose. The aromatic needles are widely used for stuffing balsam pillows. Oil of fir, sometimes used in pharmacy, may be distilled from either needles or bark. The young shoots are smooth with fine, grayish hairs, and the stout, blunt winter buds are resinous.

In early spring each tree produces male and female blossoms. Yellow catkin-like staminate blooms about one-quarter inch long emerge from the under side of the leaf axils over most of the past year's growth, but the erect, purple three-quarter inch cones containing the ovulate blooms are confined to the upper branches. These ripen in September as dark purple, slightly tapering, cylindrical cones two to four inches long and one to one and



The deep blue-green spires of Balsam Fir reach heights of sixty feet and more

Devereux Butcher



a quarter inches wide. They stand erect like tapers on a candelabrum, and lose their overlapping fan-shaped scales soon after the seeds ripen. Each light brown, resinous seed is about a quarter inch long with a shining wing of about the same length. Heavy cone crops occur at intervals of two to four years. The winged seeds drift considerable distances, to germinate in moist exposed soil and on moss covered stumps, but many are eaten by grouse and small animals. Some natural reproduction occurs when the lower pendant branches become covered with soil and take root.

The bark of mature trees is dull, reddish brown with many thin scales and about half an inch thick. That of young trees and branches is thin, smooth, ash colored and underlain with many resin blisters. These are the source of Canada balsam — a greenish yellow, transparent, sticky fluid which dries into a transparent mass. It is used in pharmacy and as a medium in which to mount material on microscopic slides.

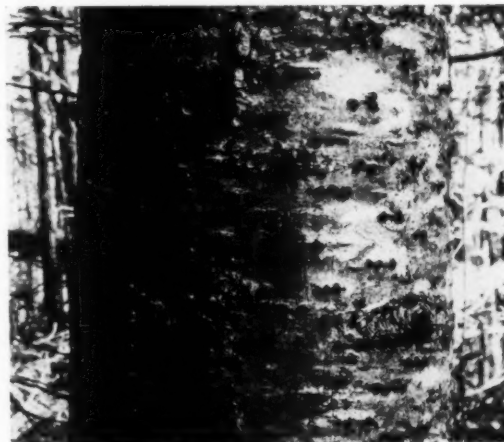
The wide-ringed, yellowish brown wood has a narrow band of white sapwood one to two inches thick, and weighs twenty-four to twenty-nine pounds to the cubic foot when air dry. It is soft, brittle, and quickly perishable. Its major use is for paper pulp, but considerable lumber goes into interior trim, crates, and packing boxes. It is often sold with spruce. The commercial sources of balsam fir are Maine, Vermont, Minnesota, Wisconsin, New Hampshire, Michigan, Virginia, and New York from which 17,690,000 board feet were produced in 1937. In 1936, 365,200 cords of fir pulpwood were produced. Large numbers of small to medium sized, symmetrical Christmas trees are cut. Not only is their form attractive, but the rich green, blunt needles remain firmly attached and retain their color long after the tree is actually dry.

Balsam fir suffers comparatively little fire damage because of its moist locations, but when fire occurs the large number of resin blisters under the bark cause terrific heat. The shallow root system makes balsam fir easily wind blown and dangerous fire traps may result. Undoubtedly, its worst enemy is the spruce budworm, whose ravages extend from the Atlantic into Minnesota and central Ontario. Several fungi are also damaging.

This fir seldom prospers as an ornamental tree because of its susceptibility to city smoke and gases and its need for constant soil moisture. It has proved satisfactory in cool, moist, sheltered locations for about fifteen years before becoming ragged and unattractive.



The dark purple cones stand erect amid the plump, upturned foliage of the upper crown



The ash colored bark of young trees is underlain with many balsam blisters



The natural range of Balsam Fir lacks little of being transcontinental

## WOOD IN MODERN WARFARE

(Continued from page 10)

in the two directions. This material is produced in large sheets and thus fills the long-felt need for a product that can be assembled quickly upon the site with the minimum of labor. The prefabrication of hutments is now under way in England. Already plywood is in demand by our army for housing the new enrollees in the United States pilot training corps.

Reliable estimates of the amount of timber that during the World War went into the shoring up of trenches and dugouts, into the miles and miles of trench duck boards, wire-entanglement stakes, and corduroy roads, and into artillery and trench screens are not available, but the quantity, on the hundreds of miles of front surely totals to several hundreds of millions of feet. As high as 30,000 trees were used daily by a single French army corps. While this amount may be above the average, yet it gives some idea of the vast amount of wood that is required at the front in warfare. Additional millions of feet of lumber are required behind the lines for military railroad construction.

No other material used for construction purposes combines in such a high degree the qualities of universal availability and workability as does wood. Weight for weight, wood is stronger in some properties than steel. Its durability is sufficient for all common uses, while by the selection of certain species or the chemical treatment of other species, it can be made

to last indefinitely in locations favorable to decay. Wood can be had in the United States everywhere on short notice; it is transported on almost any kind of railroad equipment, subject to little damage enroute, and can be used by all—chisel, saw, and plane quickly fitting it for a multitude of purposes.

Since the very life of England's navy and of her manufacturing interests depends upon the uninterrupted operation on a vast scale of the English coal mines, the shortage of pit timber during the World War was extremely serious. England, in fact, had to sacrifice the timber in her big game parks and on the home estates. Lacking men to work up this timber, she called upon Canada to provide several forestry battalions, woodsmen under military control, to fell and convert her forests into usable material.

One of the early requests of the Allies on the entrance of the United States into the World War was for the organization of a forestry regiment, to go to France at an early date and aid in securing the needed wood supplies from the French forests behind the lines.

Tremendous quantities of wood are still used in the construction of army escort wagons, automobile trucks, and wheels for horse-drawn artillery. The big problem is to get the wood, particularly the hardwoods, dry as quickly as possible with the (Continuing on page 47)



F. A. SILCOX

As this issue goes to press, the forestry and conservation world was shocked by the news of the sudden death on December 20 of Ferdinand A. Silcox, Chief of the United States Forest Service since 1933. A native of Georgia, Mr. Silcox was fifty-seven years old.

## TREES AND THEIR USES—No. 47—BALSAM FIR



# THE WAGE-HOUR LAW AND THE SOUTHERN LUMBER INDUSTRY

BY HERBERT B. McKEAN

THE southern lumberman is perhaps more affected by the wage-hour law of June 25, 1938, than any other industrialist. He certainly has been forced to make more changes than lumbermen in other sections. This law, which became effective on October 24, 1938, was designed, according to the Administration, to eliminate conditions detrimental to the maintenance of minimum standards of living necessary for health, efficiency, and general well being for labor. Its history discloses that President Roosevelt believes firmly that wage increases will result in greater buying power. He believes this law will increase wages by setting a minimum wage standard to raise the average income of all workers and increase employment by establishing the maximum number of hours an individual can work. With the South singled out as the "Nation's No. 1 Economic Problem," the administrator of the law has suggested it as a major means of relieving the economic situation in that great section.

Specifically, the law provides a maximum work week of forty-four hours for the first year, and, effective on October 24, 1939, a reduction to forty-two hours during the second year. Thereafter, it will be forty hours a week. Any person covered by the act who works more than the maximum number of hours must be paid one and a half times the regular wage for overtime. There is no limit, however, to the amount of overtime one may work. Exceptions in the prescribed number of weekly hours are made for seasonal occupations such as northern log driving operations and for plants where the National Labor Relations Board has certified contracts with a labor union which meet certain prescribed conditions. The minimum wage was set at twenty-five cents an hour for the first year and thirty cents for the six years beginning October 24, 1939, unless increased by the administrator upon the recommendation of an industry committee. Thereafter, unless the administrator finds that further increases will reduce employment, the rate will be boosted to forty cents an hour. These provisions apply to employees of all firms whose products enter interstate commerce either directly or indirectly. Farm labor and certain administrative and professional workers are not covered by the law.

Membership of industry committees is divided equally among employees, employers, and the public, and they are chosen with due regard to geographical location. Each committee recommends to the administrator the minimum wage which should apply to the particular industry in question. During the first year these committees could only recommend raising the minimum wage, but since October 24, 1939, recommendations for increases or permanent establishment of rates of thirty cents an hour are permissible.

The President is required to appoint an administrator whose duties are to appoint industry committees, determine groupings or decide what activities should make up an industry, assemble wage and employment figures, con-

vene industry committees and request their recommendations, give notice of committee meetings so that interested persons may attend, and issue orders to effectuate such committee wage recommendations as are approved. When orders are not made effective the administrator may reconvene the committee and ask for new recommendations, or dismiss them and appoint a new committee.

The law is frequently objected to because goods derived and sold strictly within a given state may be manufactured without regard to the prescribed standards; because of the added rules and regulations placed on business; and because the administrator is not required to follow recommendations of the industry committee. The provision that employees can sue their employer has resulted in some worry, although this has proved effective in forcing its observance. Perhaps most significant, however, are the legal ambiguities whose clarification is left largely to administrative orders and interpretative bulletins.

On July 15, 1938, one month after the law was enacted by Congress, President Roosevelt appointed Elmer F. Andrews, formerly industrial commissioner for New York State, Administrator. A month later Administrator Andrews stated he would postpone work with the lumber industry until 1939. In February 1939 the appointment of an industry committee for lumbering was postponed on the ground that he was satisfied with conditions in this industry, and in September 1939, Lieutenant Colonel Philip B. Fleming of the Army Engineer Corps, displaced Mr. Andrews as administrator, but as yet no lumber industries committee has been appointed.

A preponderance of the southern lumbermen who fought the passage of the wage-hour bill, and like it no better since it has passed, observe the law to the best of their ability. Many small mills, however, and especially those in the Atlantic Coast States give it little attention. To date these operators have received what they consider competent legal advice to the effect that it can be disregarded, without reference to the ultimate destination of their product, so long as it is sold strictly intrastate. This is contrary to the administrator's interpretation of the law. A few seek exemption, claiming that they are employing farm labor.

The fact that there are some mills whose product never leaves the state of origin allows them to work their help long hours and pay below standard wages. The framers of the law may have been cognizant that such competition would develop, but realized the wage-hour law might share the same fate as the NRA were efforts made to bring strictly intrastate mills into line.

When the law was passed in June, 1938, the southern lumber industry, with its alleged notoriously low wages, expected to bear the brunt of a strict enforcement campaign. Soon after his appointment, however, Administrator Andrews announced that enforcement would be put into effect gradually, to give industry an oppor-



tunity to adjust itself. He even expressed the hope that enforcement would eventually be assumed by the state labor departments. In pursuance of this gradual enforcement policy, investigators made all possible adjustments in the field to avoid bringing the violator into court. This is perhaps a fair and tolerant policy, but one that has encouraged certain elements of the lumber industry to drift towards non-observance. It is also significant that most of the present violators were paying low wages before October 24, 1938, while the observers had long been paying high wages.

On April 8, 1939, after receiving reports on forty-two cases out of 139 which had been investigated, Administrator Andrews finally secured an injunction prohibiting the shipment of lumber from a concentration yard in Virginia. This first action had the effect of forbidding the sale of some 2,500,000 board feet of lumber in interstate trade.

During the summer of 1939, the enforcement agency was decentralized and a contingent of investigators, with headquarters in Atlanta, went to work in the South. This change, however, brought no striking results. The policy of allowing time for the southern sawmill operators to adjust themselves apparently developed further lethargy in the enforcement ranks. Certainly, lack of enforcement continued.

After more than a year, one may ask, "Has the law succeeded in raising wages of employees?" To answer this, one must first consider the wages generally prevailing prior to October 24, 1938. According to an early statement by Mr. Andrews, the average annual industrial income in the South was \$865 in 1938, as compared with \$1,219 in the North. Without assuming Louisiana to be typical of the South, its average lumber worker's income for 1938 was \$721.05. The better organized southern lumber operators were paying twenty-three to twenty-five cents an hour in 1938 and for some time before. The relatively small size of the timber, sparseness of the stand, and other forest conditions limited the use of skilled labor and mechanized equipment, with the result that the actual labor costs necessary to the production of a given quantity of lumber were higher than on the West Coast where wages were nearly double those in the South.

What is now taking place? The income of employees in the large mills has dropped sharply. Few of the large sawmills were paying any of their labor less than twenty-five cents, so that the wage-hour law merely reduced the working hours of their employees without increasing the hourly wage. The obvious result was reduction of income. Several employees reported a decrease in total income from \$16 to \$50 a month. Bank deposits in one mill town, where high wages were paid before October 24, 1938, declined by ten per cent a short time after the men began working under the new conditions.

Most of the smaller mills were paying wages below the twenty-five cent minimum set by the wage-hour law, so that shorter hours at higher wages gave their men an income generally in excess of that received before the law became effective.

Considering conditions in large and small mills, the total income received by all southern lumber workers is larger than before the law became effective. For example, the total monthly income of all lumber workers in Louisiana increased about twelve per cent for the months of November and December of 1938 as compared with the first nine months of that year. Since the close of the year is generally a dull period in lumber circles, most of this increase can be attributed directly to the wage-hour law.

Sawmill men estimate the number of people employed

has increased four to seven per cent as a result of the wage-hour law. The Louisiana Department of Labor shows an expansion of nine per cent in the lumber industry of that State. Watchmen, saw filers, firemen and machinists were most largely affected by this increase.

In general, employees prefer the shorter hours. This is particularly true of negroes. On the other hand, some dislike the shorter work day because of changes in long established habits. Wage earners in the higher brackets, however, have reason to be dissatisfied.

All manner of schedules have been arranged to eliminate the payment of overtime wages. During the first year most mills ran five and a half days of eight hours each week. Others shifted labor in such a way that the mills could run fifty-five hours a week without paying overtime. Still others ran two eight hour shifts to make sixteen hours a day. A few small mills operated ten hours for four days and stopped at eleven on the fifth day of each week. Some mills have operated on a temporary basis to learn the effects of the new conditions, while a few shut down entirely until some of the uncertainties were clarified. Another group is reported as working more than forty-four hours a week and paying time and a half for overtime. As against this, C. Arthur Bruce reports the average work week for the entire lumber industry is 40.3 hours.

Lumbermen are naturally concerned with increased costs as a result of shorter hours and, in some cases, higher wages. From June 14, 1938, when the bill was passed, to October 24, 1939, when it became effective, predicted increases ranged as high as \$4.50 a thousand board feet. This would have been a boost of about twenty per cent. After the law became operative, however, the estimates on cost increases were reduced. It is now generally agreed that \$2 to \$3 per thousand board feet have been added to the cost of lumber production. For this, the shorter hours, with constant overhead charges and decreasing production, rather than the twenty-five cents an hour wage level are largely responsible. If market conditions would justify two shifts, costs might even be reduced.

It is difficult to see how increased wages will increase buying power when prices take a corresponding increase. In reviewing similar situations in other industries, Administrator Andrews recalled that men work more efficiently for eight hours than they do for ten, and predicted the shorter hours will actually benefit all parties concerned. It is hoped that their increased efficiency will justify the increased wages.

After a year of operation under the wage-hour law, many small and medium sized mills have closed and only a few have gone on double shifts. Some of the inefficient workers have been replaced by more efficient and frequently by younger men. While many owners believe their mill is being run on the basis of the law, they fear disastrous results should the courts give a different interpretation to the law. One thing is certain—the lawyers are having a field day with many clients wondering what they can or cannot do.

After the smoke of argument and controversy has cleared, the idea of controlling wages and hours may prove to have been good legislation. Some lumbermen admit that the present rules have not hurt them as badly as they anticipated, but with the thirty cent hourly wage in effect they are worried about the next step to forty cents. As one operator said, "When we become accustomed to the new hours and forget our old habits, we will be getting along just as well as before the law was passed." Meanwhile, every mill-man says, "If only prices would go up we wouldn't object to the law so much."

## Grange Indorses Restoration Bill

The principle of voluntary cooperative or leasing agreements between forest land owners and the Secretary of Agriculture was endorsed by the National Grange at its annual convention in Peoria, Illinois, November 15 to 23, 1939. The same meeting reaffirmed the previous action of the Grange in demanding the retention of the Forest Service and its several functions in the Department of Agriculture.

Other resolutions requested more federal aid to private owners under the principle of the Clarke-McNary Act (federal government participating on a 50-50 basis with states and private owners, states administering the funds under federal standards) for control of forest fires, insects and diseases; critically needed federal forest research and speedy completion of the forest survey of the United States; more rapid progress in acquisition and addition to the national forests of forest and sub-marginal farm lands mainly unsuitable to private ownership; improved protection and administration of the national forests with emphasis on more intensified range administration, fire control, protection against blister rust, more adequate personnel for administration of wildlife, care of camp grounds and forest improvements, and better forest roads and trails; and placing the Prairie States Forestry Project on a dependable instead of an emergency basis.



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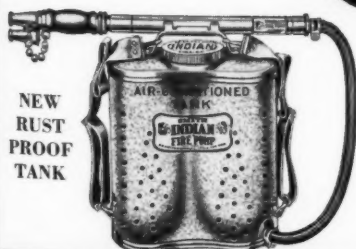
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# ANOTHER NEW WOOD-BURNING HEATER

By LAUREN E. SEELEY

THE burning of wood may have been man's first experience with fire. At least wood has been a source of heat for unknown ages and it is still serving a large part of the world's population. Wood ignites so easily and burns so readily even in the open, that almost anyone can manage to secure heat. If wood had been somewhat less obliging in its readiness to burn, it probably would have received more thought and study relative to efficient combustion.

The device to be described, known as the Char-Wood Heater, being designed to provide heating comfort, makes a brief review of history of heating with wood appropriate. In the beginning, the campfire afforded rude comfort. When shelter was devised the campfire became the fire on the hearth. The hearth was then a raised place in the center of the room. The smoke was more or less free to fill the room and no one will know how many inflamed eyes and how many coughs resulted. Later on it was the custom to have winter and summer apartments in the same building. The winter apartments were never decorated because the smoke would soon make them grimy.

The Greeks hailed the discovery of charcoal as a great improvement because it gave off no smoke. The Romans built wood fires beneath the stone floors of some of their buildings to heat the space above the floor. The wood gases were then conveyed through ducts to the rooms on the second floor where the remaining heat and all of the smoke was delivered.

The introduction of the chimney about seven hundred years ago was an important contribution to human health and comfort. By means of the chimney fuel gases could be removed without polluting the air within the room. By moving the fire on the hearth to the side wall and connecting a chimney thereto, the fireplace gradually developed as we know it today. While the fireplace was a big improvement over the past, its efficiency was low and in severe climates its heating capacity left much to be desired.

Benjamin Franklin, while living in France, learned about certain types of fireplaces which led him to invent the Franklin fireplace stove. His fireplace was moved into the room so the back and sides of the fireplace could add more heat to the room. This suited American needs better and gave better economy. Soon it was discovered that doors or covers might be placed across the fireplace opening, saving still more fuel. Thus the closed iron stove came into being. It is the closed stove that has been serving Americans faithfully for more than a hundred years.

To introduce another wood-burning heater and term it "new" may be overly optimistic after more than a century of stove making. The reader will have to judge

Interest in the possibilities of greater utilization of fuel wood through the development of improved types of wood burning heaters for home use continues unabated. Few articles have brought more inquiries for further information than those published on this subject in the last two issues of **AMERICAN FORESTS**. In last month's issue reference was made to an improved wood using unit known as the Char Wood Heater, recently developed through redesigning studies by Professor Lauren E. Seeley of the Yale School of Engineering. At the request of the editor, Professor Seeley here describes this improved heater which is now being placed in production by the H. B. Smith Company of Westfield, Massachusetts.

for himself. A "new" wood-burning heater will be to the consumer merely "another" heater unless it can meet a need or desire previously unsatisfied. The heater to be described is intended to provide convenience of operation, steadiness of heat generation and a character of heat emission which provides the best heating comfort. Secondly, the heater is capable of doing its job on trimmings which may be obtained from lumbering and sawmill operations or from the "weeding" operations of the family woodlot.

Chunks are not required. In fact, it is recommended that pieces should be kept below four inches in diameter. A heater which makes woodland trash into a useful fuel in this country can be called something new.

More specifically, convenience of operation means greater freedom of attendance. The heater, with its magazine or wood box compactly filled, is expected to generate about 40,000 B.t.u. hr. for an eight-hour period without attention. This amount of heat will take care of two to three rooms, depending upon size and arrangement during cold weather. For ordinary weather the period will be longer and in mild weather the heater will easily run for twenty-four hours without attention.

It is evident that long firing periods will require the necessary storage space for the wood. This heater has a storage space or wood box seventeen inches long (for sixteen-inch wood) twelve inches wide and nineteen inches deep. This gives a volume of about two and one-quarter cubic feet. About two cubic feet of wood carefully packed should provide over fifty pounds of hard wood in the wood box. Thus it can be seen that long firing periods are not realized by a sacrifice in the supply of heat. The general object was to give users of wood about the same convenience that users of anthracite coal in hand-fired furnaces obtain.

Steadiness of heat generation requires a different method of wood burning than is commonly employed. The chills and fevers of the common stove are directly associated with the use of wood. The closed or airtight heater will hold down the rate of burning and the present heater must necessarily be air-tight. However, that in itself is not enough. In the usual up-draft burning the entire mass of wood must become heated before the wood gases will burn at the top of the wood mass. This means that a considerable destructive distillation of the wood must take place. In such an arrangement there is no assurance that there will be any or enough oxygen at the top of the wood to burn the gases. If the wood is not wholly heated by an up-draft burning it means that some of the wood gases may continually escape unburned. These wood gases contain the creosote that has plagued users of wood ever since stoves were made.

(Continuing on page 37)



The scheme may be explained as follows. The bottom of the wood box previously mentioned is a special grate. The top is a lid which may be opened for recharging. The front side of the box does not extend clear down to the grate, however, but stops about two inches above it. Thus the box is not completely closed. All of the gases from the burning wood must pass in a horizontal direction to this front opening. It is the only escape for the gases. The effect is to confine the combustion zone of the wood to the bottom of the box just a few inches above the grate. The gases escaping directly from this combustion zone are necessarily quite hot. The wood immediately above the combustion zone is subjected to heat and destructive distillation which produces combustible gases. The wood gases, however, must escape by going into the combustion zone and passing through the front opening above mentioned. When the gases have left the wood box, highly heated but not completely burned, they pass into small passageways which may be called combustion ports. Secondary air from the ash-pit passes into some tuyeres which heat the air and inject it into the combustion ports. This causes the wood gases to burn. It should be noted that while an ashpit damper determines the total air supply, the design of the tuyeres insures that the air thus admitted to the ashpit will be divided between the grate and the tuyeres in a predetermined proportion. This proportion is always assured.

Thus as nearly as possible one finds a controlled combustion zone, controlled air supply, controlled distillation and controlled gas burning. Within the rates of burning contemplated, the rate of heat generation will be found to vary with the damper setting and to be remarkably steady. If the damper is set with regard to the weather condition it may be left untouched for hours at a time. It is necessary only to shake the grate at each firing and set the damper according to the weather. The amount of air damper opening required is surprisingly small.

Finally it should be said that the fuel bed in the combustion zone is kept uniform by the wood which comes from above as the wood in the combustion zones burns away. Also that during the latter part of the firing period only charcoal remains in the wood box. This burns cleanly and uniformly with the secondary air in the combustion ports now burning the carbon monoxide that inevitably forms.

The character of heat emission is one which affords plenty of direct radiation near the floor. The importance of warm floors, warm feet and legs is universally recognized. The heater maintains the combustion zone always near the base. This gives the highest temperatures at all times where they belong. The elimination of cold drafts along the floor means greater comfort and family health.

The rest of the heater is simple. The gases from the combustion ports rise through a vertical flue formed by the front of the heater and the front side of the wood box that is open just above the grate as previously described. The gases then travel back (Continuing on page 47)

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Poor shade tree planning. Street widening has resulted in root cramping; overhead wires have caused mutilation

The New Year is a good time to get clearly in mind "Your Shade Trees." In a possessive sense most people, especially those living in towns and cities, think of their shade trees as those growing on their own properties. "My shade tree problem," you may say, "is very simple. I have only a half dozen trees growing in my yard and a little attention from year to year keeps them in good condition."

But out in front of your yard, growing between the sidewalk and the street, are several trees which add to or detract from the value and beauty of your home, depending upon their kind and condition. Those trees are in a broad sense "your trees." You speak of your street as "my street" and your city as "my city," but do you think or speak of the trees along your street or throughout your city as your trees? Most people do not. Nevertheless they are "your trees" just as much as the streets, the parks and the city itself.

It is unfortunate that more people do not take this

that all city dwellers may well take to heart. The Forest City, a title Cleveland has enjoyed for a good many years, permitted city soot and smoke, disease, pests, traffic accidents, overhead wires, street repairs and vandalism to reap a heavy toll among its street trees each

## YOUR SHADE TREES

### CITY TREE LAWNS

broad civic view of street shade trees. If they did the beauty of their home environment and their whole city would become a joy and a pride and property values would be greatly enhanced. Their failure to do so accounts for the many barren and unsightly streets which characterize towns and cities throughout the country. Indeed, most American cities are examples of street tree neglect, mis-plantings and haphazard planning of municipal tree lawns. We become highly indignant and vocal if the City Fathers fail to make needed improvements in our paved streets. But we let our street trees be some one else's business with the result that they grow up—if they grow at all—like "Topsies."

A classic example of how a large city can let its shade trees go to seed, figuratively speaking, is revealed by the recent survey and census of the shade trees of the city of Cleveland. It is an example

year—despite the fact that a valuation of \$7,000,000 was placed on them. When trees died they were left standing along the streets, the injured and diseased were more or less ignored, and the few new trees that were added as a rule were haphazardly planted.

When at last the awakening came and a city-wide tree census and study was ordered as a first step toward a program of rehabilitation, the full extent of this modern city's neglect of its valuable tree asset was revealed. First it was found that of the 118,146 trees, representing 105 species, growing on the tree lawns of Cleveland, a large share were undesirable for city requirements. Conspicuous among these were the silver maples and Carolina poplars which accounted for twenty-one per cent of the total number of trees, and to a lesser degree, the catalpas and sycamores. The reason for this, of course, was that in lieu of careful selection and planting by experts who had the needs of the city as a whole in mind, the species planted resulted from the whims of property owners and accidental occurrence.

It was further brought out that although Cleveland boasted 118,146 city trees, there were also 101,374 plantable spaces in the tree lawns on which no trees were growing.

The physical condition of the trees



Good shade tree planning. Notice uniform spacing of pin oaks and ample tree lawn

was a monument to neglect. Only four per cent of the total number, or about 4,000, were found to need little or no attention. Seventy-nine trees out of every hundred needed pruning; eighteen out of every hundred were diseased, seventeen affected by insects, while six out of every hundred were badly mutilated. Where disease was concerned, it is interesting to note that of the city's 50,000 maple trees 7,000, or fourteen per cent, were infected, as were 4,600, or twenty-three per cent, of the 20,000 sycamores, and 2,600, or thirteen per cent, of the 20,000 elms.

In view of these findings what does Cleveland propose to do? The City Department of Parks and Public Property has made the following recommendations:

"The City of Cleveland should establish a Bureau of Forestry and employ a thoroughly trained and experienced city forester.

"The entire city tree problem should

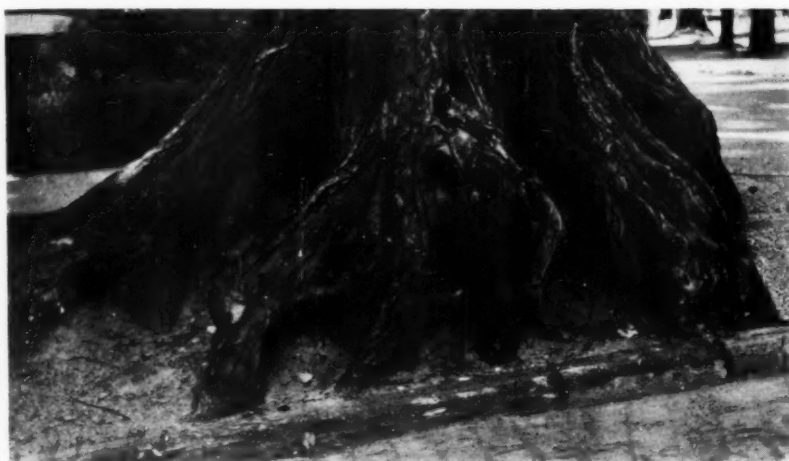
ed against by inspection.

"A program of gradual substitution of desirable trees for undesirable trees should be set up and entered upon so that, as time passes, this major problem will be in process of solution. Along with this work of substitution should go the job of seeing that no more undesirable trees, such as silver maples, are planted.

"Experimental work, with carefully kept records, should be carried on to serve as a reliable guide to future developments. Soil studies, invaluable to the forester, should be made.

"Trees should be included in, and become a part of all new street and highway developments, and ample space for the proper type of trees in uncramped quarters should be provided.

"Also, even very small islands of isolated land should be used as small parks for the planting of a tree or trees where condi-



Root cramping due to too narrow tree lawn. Note, also, root and base cavities in need of surgical attention

be visualized as a unit and long-range plans developed. Types of trees should be chosen with reference to types of streets—small, slender trees on narrow streets and stately trees, with ample crown, on broad avenues and parkways. Considering the wealth of native species available, the city's tree planting should be so diversified as to utilize fully the splendid qualities of such trees as sugar maple, tulip, white, red, pin and black oak, and white and green ash.

"The need of city trees for continuous care should be recognized as an exceedingly important part of the city tree problem, and ample provision made for such care. A program of continuous inspection and reporting should be part of such service, employing the plan of 'tree wardens' so successfully in operation elsewhere. During building operations, street repairs and other improvements trees often receive grave injuries as a result of carelessness or ignorance on the part of workmen. This should be guard-

tions for growth are suitable. Possibly tax delinquent lands may be purchased by the city for tree sanctuaries.

"Campaigns for the abatement of smoke and the elimination of overhead wires should be pressed with all vigor, for these are the two major evils with which city trees have to cope. The worst of these is smoke. If this cannot be curbed, trees such as the alanthus and ash-leaved maple which are not seriously affected by a smoke-laden atmosphere should be used."

City dwellers everywhere should not ignore these findings and recommendations, for what has happened to Cleveland's tree lawns is in all probability happening in other cities. They should take pride in the condition of their street trees and demand that they be given proper attention and care.

Make "your city's" trees "your trees"—and see that they have the same attention and care you give to the trees on your own lawn.

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THE NORTH AMERICAN ASSAULT ON THE CANADIAN FOREST, by A. R. M. Lower. Published by the Ryerson Press, Toronto, Canada, and Yale University Press, New Haven, Connecticut; also Oxford University Press. 377 pages. Price \$3.75.

Interwoven through this comprehensive record of "The North American Assault on the Canadian Forest" is a history of social, economic, and diplomatic relationships between Canada, and the United States, and the United Kingdom. Reaching its first high point while Napoleon was seeking to bring Great Britain to her knees by cutting off her Baltic supplies of timber, the capital and initiative of citizens of the United States have steadily encouraged the exploitation of the forests of our neighboring country. The effect of the United States in bringing about the present forest policy of Canada and the influence of Canada's forest resources on world politics is described in this volume from three points of view. Involving as it does a partial history of the United States and the relations of this country with Canada, the book is of value to all who are interested in the development of helpful relationships between the peoples of these two countries.

EARTH'S GREEN MANTLE, by Dr. Sydney Maughan. Published by the Macmillan Company, New York City. 322 pages, illustrated. Price \$3.50.

Dr. Maughan, an English professor of botany, has presented in "Earth's Green Mantle" an evolutionary story of plant life. He discusses in a thoroughly comprehensive manner the development of plants, their methods of reproduction, modes of life, their chemical requirements, and their relations one to another.

Students of biology—whether botany or zoology—will appreciate this popularly written and scientifically accurate study as a foundation for further research, and general readers will attain a new perspective of plant life and man's efforts to understand, utilize, and preserve the almost illimitable wealth of our natural heritage. There will be those who will want to read it because of an inherent love for "green things growing."

RAILROAD TIE DECAY, published by the American Wood-Preservers' Association, Washington, D. C. 55 pages, illustrated. Price \$2.00.

This little book is a compilation of two important papers—"The Decay of Ties in Storage," by C. J. Humphrey, and "Defects in Cross Ties Caused by Fungi," by C. Audrey Richards, both of the Bureau of Plant Industry at Madison, Wisconsin. The first deals with the more common fungi which attack ties in storage throughout the central and northern United States while the second deals with the growth of wood-destroying fungi and discusses particularly the many fungous forms that occur in the more important woods used for ties. The book was prepared in co-operation with the Forest Products Laboratory and it is strikingly illustrated by plates both in color and in black and white.

## NEW BOOKS and OTHER PUBLICATIONS

A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

SOIL CONSERVATION, by Hugh Hammond Bennett. Published by McGraw-Hill Book Company, New York City. 993 pages. Illustrated. Price, \$6.00.

The history of the insidious inroads of erosion upon the civilizations of the world, with special reference to its cause and cure in North America, is presented in Hugh H. Bennett's encyclopedic volume, "Soil Conservation." "Since the first crude plow uprooted the first square foot of sod, and since man's ax first bit into virgin forest" erosion has been gaining until, under the author's guidance one sees with startling clarity its effect upon the entire United States.

Dr. Bennett draws upon the world for text and photographs to prove that a permanent agriculture is only possible when people are willing to pay the price for protecting the soil. Where that price has not been paid, civilizations have been disintegrating and disappearing, for soil erosion "if uncontrolled impoverishes not only the land but those who live on and by the land."

Specific reference to the accomplishments of the past decade proves that America can cope with its erosion problem. Like a dire prophet of another age, however, the author declares that natural decadence lies ahead "unless the United States goes ahead vigorously, persistently, and speedily to defend and conserve the soil."

"Soil Conservation" is more than a record of past mistakes and present efforts to rectify them; it is more than a text book; it is a handbook of detailed information so inspiring or perhaps so accusing as to arrest the attention of all who are devoted to the permanent welfare of this nation.

AN OUTLINE OF GENERAL FORESTRY, by Joseph S. Illick. Published by Barnes and Noble, New York City. 297 pages, illustrated with maps and charts. Paper edition \$1.00; cloth edition \$1.50.

This is a third, — revised and enlarged edition of a standard and well known

work. In addition to the revision, there are several new chapters. Designed primarily as a general introduction to forestry and related branches of conservation, this late revision makes current the information given on the wide range of topics covered.

NORTHLAND FOOTPRINTS, by Kenneth C. Ibbear. Published by Charles Scribner's Sons, New York City. 339 pages. Price \$2.50.

The author of "Northland Footprints" has woven an interesting fictional story around the lives of small animals found in the Canadian woods. He has achieved that rare combination of truth and fiction which is so difficult when attempting to humanize the lives of animals.

THE BOOK OF INSECT ODDITIES, by Raymond L. Ditmars. Illustrated in color by Helene Carter. Published by J. B. Lippincott Company, Philadelphia, Pennsylvania. 62 pages. Price \$2.00.

In this, Dr. Ditmars describes the most interesting usual and unusual forms of insects which inhabit the earth. The book is divided into five chapters describing those species found in North America, Central and South America, Europe and Northern Africa, India, China and Japan, and Australia and New Guinea. Miss Carter's beautifully colored illustrations and maps will delight the reader.

The publications listed below must be ordered direct from the addresses as given.

Soil Defense of Range and Farm Lands in the Southwest, by E. M. Rowatt. Soil Cons. Serv., U. S. Dept. of Agr. Supt. of Docs., Wash., D. C. Price 10 cents.

3,000 Books of Leisure. Bibliography in the field of leisure. Published by Leisure, 383 Atlantic Avenue, Boston, Mass. Price 10 cents.

Effects of Fire and Cattle Grazing on Longleaf Pine Lands As Studied at McNeill, Mississippi, by W. G. Wahlenberg, S. W. Greene and H. R. Reed. U. S. Dept. of Agr. Tech. Bull. 683. Supt. of Docs., Wash., D. C. Price 10 cents.

Progress in the Control of Elm Diseases in Nurseries, by J. C. Carter. Biological Notes No. 10, Natural History Survey Division, State of Illinois, Urbana, Illinois.

Food Habits of North American Diving Ducks, by Clarence Cottam, Bureau of Biological Survey, U. S. Dept. of Agr., Tech. Bull. 643. Supt. of Docs., Wash., D. C. Price 30 cents.

The Relationship of Stream Flow to Precipitation on the Salt River Watershed Above Roosevelt Dam, by Charles K. Cooperrider and Glenton G. Sykes. Forest Service — Southwestern Forest and Range Expt. Sta., Univ. of Arizona, Tucson, Ariz.

Food Health of Prairie Dogs, by Leon H. Kelso. Bureau of Biological Survey, U. S. Dept. of Agr., Circ. No. 529. Supt. of Docs., Wash., D. C. Price 5 cents.

AMERICAN FORESTS



## Joint Committee Hold Five Forestry Hearings

Research in silviculture and wood utilization of southern hardwoods, the Forest Restoration bill, farm forestry extension in the South, and tax reform, along with the need for more extended protection of forests from fire, were spotlighted at the hearing of the Joint Committee on Forestry at Mobile, Alabama, on November 14 and 15. With Senator John H. Bankhead, 3rd, conducting the hearings, they were attended by Senator D. Worth Clark of Idaho and Representatives Hampton P. Fulmer of South Carolina, Dan Reed of New York, Wall Doxey of Mississippi, and Walter M. Pierce of Oregon. The members of the committee, together with a considerable number of public representatives, also visited the selective cutting operations of the W. P. Smith Lumber Company at Chapman, Louisiana, and of the T. P. Miller Lumber Company, at Brewton, Louisiana. To this was added an excursion to the naval stores operations of the Alger-Sullivan Company.

With special reference to the problems of small timberland owners of the South, who were reported as receiving from thirty-five to seventy-five cents a cord for pulpwood on the stump, Senator Bankhead suggested the government declare timber a public utility and fix prices on forest products. In support of this he also cited the present program of price control of cotton. Senator Clark

countered with a defense of cooperative marketing associations and Representative Fulmer asked if price control could not be adequately covered in the leasing plan as included in his forest restoration bill. During the entire discussion members of the committee were in general agreement that large federal expenditures for rehabilitating the nation's forests warrant the government in assuming the power to regulate their use. In opposition to this Julian F. McGowin, of Chapman, Alabama, voiced the opinion of other timberland owners when he said that federal regulation of cutting practices would not solve the South's problems. He added that there are other problems, one of which is the need for markets for forest products.

The desirability of including authority for federal aid in developing community forests in the pending Forest Restoration bill; the Forest Restoration bill itself; more effective federal and state aid to small timberland owners in marketing their forest products; revision of inheritance tax laws to avoid forced division of forest properties and disturbance of extensive forest management

plans; more effective public school education in forestry and conservation; and increased federal funds for cooperative forest fire protection were among the suggestions submitted to the Joint Committee at the hearing held in cooperation with the New York State College of Forestry at Syracuse on November 9 and 10.

Reviewing the history of communal forests as conducted by villages, towns, cities and other political subdivisions in certain European countries, Professor Nelson C. Brown, of the New York State College of Forestry, indicated that the establishment of similar forests in this country could offer employment at the rate of one man for every fifty or one hundred acres of forest land so used.

The Forest Restoration bill met with more criticism in the northern hearing than in Alabama. Direct opposition was voiced by Extension Forester J. A. Cope of the New York State College of Agriculture. He contended that restoration of farm lands can best be accomplished

through education along what is generally recognized as the "democratic pattern." That this was not the accepted point of view of all members of the committee was shown by Representative Pierce, who said, "I believe we are reaching the period when the law will have to say whether you may cut a tree on your own land."

Vice Chairman Hampton P. Fulmer of South Carolina served as chairman of the Syracuse meeting, which was attended by Representatives Wall Doxey of Mississippi, Walter M. Pierce of Oregon, and Daniel A. Reed of New York.

With the completion of these public hearings, the committee headed toward the West Coast, where hearings were held in the Chamber of Commerce Building in California on December 6 and 7; in the Portland Hotel in Portland, Oregon, on December 12 and 13; and in the State House in Madison, Wisconsin, on December 18 and 19. One is tentatively scheduled to be held in Boston early in January, and the final hearing will be conducted in Washington early in February. Commenting on the western hearings, Representatives Englebright and Pierce explained that the committee desires testimony on the condition of forest lands, together with the adequacy and effectiveness of present practices in relation to an abundant future supply of timber and forage. The committee sought information concerning watershed protection, flood control, stabilization of communities, water use, recreation, and other benefits of forest laws.

### WILDLIFE CONFERENCE

The Fifth Annual North American Wildlife Conference has been announced for March 18, 19 and 20, to be held in Washington, D. C., under the joint sponsorship of the American Wildlife Institute and the National Wildlife Federation. The American Wildlife Institute also will cooperate with the Federation in the sponsorship of the third National Wildlife Restoration Week, which will be observed throughout the nation from March 17 to 23.

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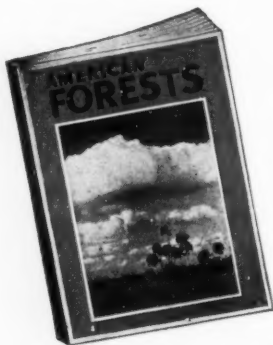
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## FORESTRY IN CONGRESS

By G. H. COLLINGWOOD

Nearly 20,000,000 acres, the remnant of lands which the federal government granted the western railroads to help finance their structure from 1850 to 1874, will be returned to federal ownership if recommendations of the Secretaries of the Interior and of Agriculture to the Senate and House Committees on Interstate Commerce are followed. Their proposals were made with reference to S. 2009 as passed by the Senate and amended in the House, S. 1915, S. 1990, S. 2294, and H. R. 4862, relating to the reorganization of the railroads. Specifically, the two Cabinet officers recommended that the land-grant railroads be required to restore to the federal government all the remaining granted lands not used in the operation of the road as a partial *quid pro quo* for abolishing the current preferential rate under which the federal government may transport goods, personnel, and troops at one-half the regular tariffs. Under this limitation federal savings now average from \$7,000,000 to \$10,000,000 each year.

Original grants approximating 132,000,000 acres actually passed to the railroads. Of these some 19,600,000 acres remain in the ownership of the six land-grant railroads or their subsidiary companies. Almost 4,000,000 acres are within the limits of about fifty national forests, with the bulk of the area in other federal reservations. Commenting on these bills, Secretary Ickes said: "The return of these lands to the public domain for conservation and management in accordance with the public land laws would provide the opportunity for a more effective land use program by the government."

The recommendations of the two Cabinet officers are not in any of the bills as now under consideration, but may be incorporated in amendments for consideration early in this Congress.

### Agricultural Appropriations

On December 4, a full month before Congress will convene, and when the Budget recommendations for the fiscal year beginning July 1, 1940, will be announced, Representative Clarence Cannon's subcommittee on Agricultural Appropriations opened executive hearings on appropriations for the Department of Agriculture. Conducted with unprecedented speed, they were completed by the afternoon of December 11. Thereupon the subcommittee recessed until January 3, when hearings will be reopened for the presentation of testimony by Representatives in Congress and by individuals connected with citizen organizations.

Forest Service appropriations were given a scant two and a half hours, less than an hour was devoted to the Bureau of Entomology and Plant Quarantine, and approximately the same time to the Bu-

reau of Plant Industry. The Bureau of the Budget's recommendations will not be released before January 4, but newspaper reports indicate that practically all items are subject to severe cuts to provide increased appropriations for the military and naval defense programs.

Appropriations for the Department of the Interior, in which the Biological Survey and the Bureau of Fisheries are now grouped with the National Park Service, Indian Office, and Reclamation Service, will be considered late in January.

### Stream Pollution

Stream pollution may receive early consideration in the House in connection with the Barkley bill, S. 685, which passed the Senate on May 1, 1939. Efforts will undoubtedly be made to amend this in accordance with recommendations of the Izaak Walton League. This may result in substituting the text of Representative Mundt's H. R. 6723, in which case the debate on control of stream pollution may be resumed in the Senate.

Last year's delay in appropriating funds for Dutch elm disease eradication and other activities of the Bureau of Entomology and Plant Quarantine may be avoided if early action is secured on H. R. 7605, as introduced by Representative Leavy. This bill gives blanket authorization for departmental action directed toward the control or eradication of several plant pests.

Senator McNary's S. 228, to authorize increasing appropriations for cooperative forest fire protection under the Clarke-McNary Act from \$2,500,000 to \$9,000,000, Representative Fulmer's leasing or forest restoration bill, H. R. 7271, and other pending forestry legislation may not receive attention until after the report of the Joint Committee on Forestry is submitted to Congress on or about April 1. This is in accordance with past recommendations of the Bureau of the Budget.

### Cascade National Park

Local meetings in various parts of the Pacific Northwest for consideration of a national park in the Cascade region indicate that efforts may be made to set aside some portions of the high country in the Mt. Baker, Chelan, Wenatchee, and Snoqualme National Forests as a national park for purposes of recreation. The belief that such legislation is pending is further encouraged by the fact that representatives of the National Park Service, the Forest Service, and the Washington State Planning Council have made joint studies of the scenic areas in this region. No report has been released.

Similar studies have been made in the White Mountain National Forest of New Hampshire and Vermont.

## FEDERAL NEWS AND REVIEWS

In the annual report of the Forest Service for 1939, Chief Forester F. A. Silcox repeats his three-point formula for the solution of the nation's forest problem—public aid to private owners, public regulation of cutting practices on private forest land, and public ownership and management of forest lands. He also builds a case for government leasing of private lands as set forth in the Fulmer-Walsh bill introduced in the House as H. R. 7271.

Forest Service expenditures for the past fiscal year constituted a total of \$74,854,124. They include some \$35,000,000 for CCC camps and work relief on state and private lands as well as on national forests; over \$8,000,000 for forest highways; \$2,053,334 for research; and \$31,721,193 for national forest protection, management and extension. Forest Service receipts during the same period were \$4,903,376, of which \$1,215,925 was returned to the states.

The Forester points to the fact that fires burned only 175,000 acres of the 175,843,405 acres within 158 national forests as existing on June 30, 1939. Tangible federal values of \$476,354 were affected by these fires.

### Forest Fire Damage \$37,000,000

Cooperative forest fire protection as authorized by the Clarke-McNary law covered 308,458,000 acres in forty states and Hawaii during the same period. This left 161,948,570 acres outside of the organized protection districts. The area burned on the protected land was 2,623,270 acres and the damage estimated at \$7,179,630. Unprotected lands suffered the burning of over 31,190,000 acres, with damages of nearly thirty million dollars. In support of an expanded program of forest fire protection, the Forester specifically urged increasing federal aid to \$9,000,000 annually.

Farm-forest programs were given emphasis, together with a detailed report of Forest Service activities in reducing the fire hazard and disposing of timber resulting from the New England hurricane. This is in line with the Forester's declaration that Forest Service stewardship extends beyond the national forests.

Commenting on the national situation, Forester Silcox states optimistically that "if fire prevention and sustained-yield forest management become general with pulp and other forest industries, if their requirements and those of the many other forest industries are coordinated, and if growing stock in the South is built up, the South and the West may be able to count on continuous harvests of more pulpwood than is indicated by the planned capacity of existing pulp mills there. As a nation," he concludes, "we may then have a margin for export."

### Pisgah Game Decision

Of nation-wide significance to wildlife management is the decision of the Federal Court for the Eastern District of North Carolina confirming the authority of the United States to control the management of game in the Pisgah National Game Preserve. Explaining that this is confined to a specific portion of the Pisgah National Forest, the chief forester wrote Commissioner J. D. Chalk, Department of Conservation and Development, that the Forest Service does not intend to depart from its general policy of cooperation with the states in wildlife matters. It will continue to follow the general pattern of the state game laws as far as is possible.

The Pisgah game case arose out of a disagreement with the North Carolina state authorities over the right of the Forest Service to remove deer from the game preserve for restocking underpopulated national forest lands in other states. Meanwhile, the deer population of the Pisgah has become over-crowded in relation to available food supply, with resulting damage to vegetation and the threat of wholesale starvation. In an effort to hold the deer population to the carrying capacity of the area, the Forest Service is cooperating with the state through annually conducted deer hunts and the capture of fawns. Only the deer estimated as necessary for removal to maintain the herd in balance are taken.

### Park Wildlife Shake-up

The administration of wildlife management in the National Park Service will be transferred early in January to the Biological Survey. As generally reported this will affect the Washington and regional offices, but will cause no changes within the several national parks. The fact that both bureaus are in the Department of the Interior makes the change one which is authorized under existing legislation. This is independent of changes which may be recommended under the President's order for government reorganization expected early in the new session of Congress. No details of the reorganization plan have been announced.

Additions to the Olympic National Park in northwestern Washington were considered on December 9 when Governor Clarence D. Martin of the State of Washington, together with two of his advisers, met with President Roosevelt, Secretary Ickes, and Secretary Wallace. This was in accordance with the Act of June 29, 1938, which authorizes the President to proclaim additions to the park within the boundaries of the Olympic National Forest and any lands which may be acquired by the government by gift or purchase, which are considered

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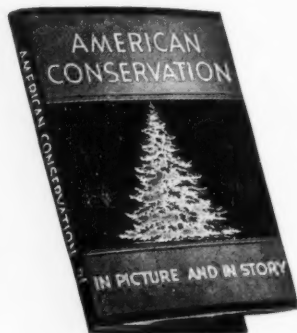
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desirable for the park. The authority has been effective since March 1, 1939, or eight months after the passage of the act. It also requires the President to consult with the governor and the two secretaries before issuing such a proclamation, which at this writing has not been issued.

### New Forest Purchases

The purchase of 143,558 acres, costing \$573,237.70, or an average of \$3.99 an acre, was authorized by the National Forest Reservation Commission on December 12, 1939. The same meeting authorized the resumption of forest land purchases in Ohio, Indiana, Iowa, and the Uharie Unit in North Carolina. With Secretary Wallace in the chair, the meeting was attended by Assistant Secretary Elbert K. Burlew, of the Department of the Interior, and Representatives Wall Doxey of Mississippi and Roy O. Woodruff of Michigan.

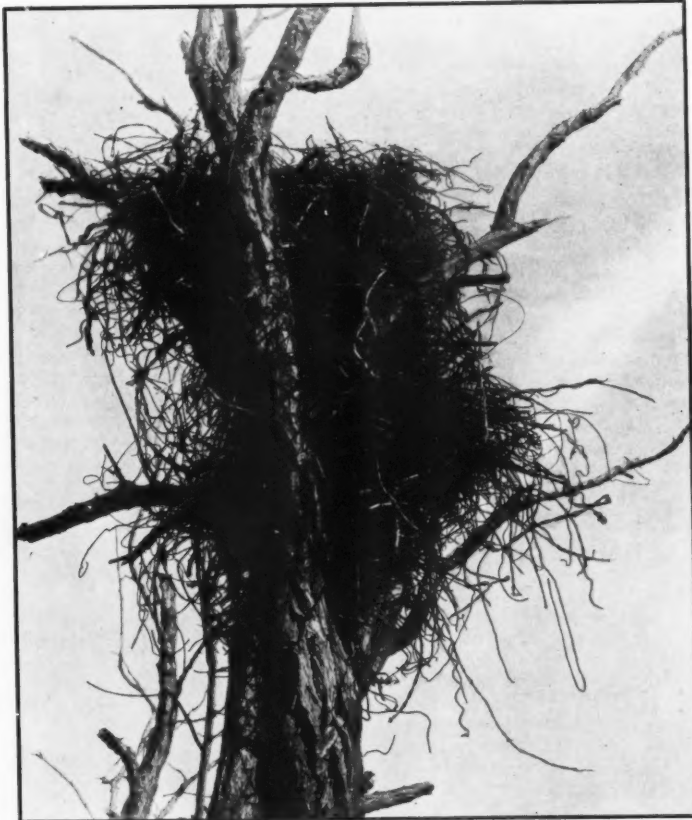
The largest purchase was in the Superior National Forest of northern Minnesota, where 27,362 acres were ac-

quired for \$2.45 an acre, or a total of \$67,152. The purchase of 2,354 acres at a cost of \$75,553 in the northern redwood purchase unit in California creates a compact body of 8,605 acres of redwood timber in federal ownership, for which a total of \$259,678 has been paid. The newly acquired lands support some 131,704,000 board feet of merchantable timber.

Another western purchase included 2,855 acres at a total cost of \$17,130.60, adjacent to the Arrowrock Dam on the Boise National Forest in Idaho. This will not only protect a portion of the watershed draining into the reservoir but will permit the removal of some 250 head of livestock now grazing on this and adjoining lands.

The decision of the commission to proceed with purchases in existing units in Ohio, Indiana, Iowa, and North Carolina results in the establishment of priority zones where less than twenty per cent of the purchasable area has thus far been consolidated.

### PUZZLE PICTURE NO. 1



This photograph was taken by the federal Soil Conservation Service in the Dust Bowl area of northern Texas. It tells a hidden story in which tragedy and ingenuity are blended. Can you solve it by answering these questions? (1) What bird built the nest? (2) Of what material is the nest largely made, and why? For correct answers, turn to page 46.

Have you a "Puzzle Picture" among your photographs? If so, submit it to the "Puzzle Picture Editor," American Forests, 919 Seventeenth Street, Northwest, Washington, D. C. Pictures selected for this series will bring their owners a year's free subscription to American Forests. So get out your album and see what you have.



## AROUND THE STATES

A two-day mass meeting of southern lumbermen to map a drive for amendments to the federal Wage-Hour law, an acute forest fire situation in Virginia and South Carolina, steps to establish a wildlife research project in Indiana, and completion of the sale of 86,000 acres of submarginal land in Minnesota's "big bog" country to the federal government, featured forestry and conservation developments throughout the states during late November and early December.

At New Orleans on November 28 a mass meeting of the southern lumber industry, held in conjunction with the fall meeting of the Southern Pine Association, adopted amendments to the following provisions of the Wage-Hour act: To Section 3, clarifying and making less burdensome provisions for a "reasonable charge" for furnishing employees board, lodging and similar facilities, in addition to a stipulated cash wage; to Section 3, providing for seasonal exemption from the hours provisions for employees engaged in logging operations; to Section 13, providing for exemption from the act of clerical, or so-called "white collar" employees, similar to amendment introduced by Georgia's Representative Cox at the last session of Congress; to Section 7, to prevent the reduction of the work-week below a maximum of forty-two hours a week; and to Section 7, to permit employees who are prevented by weather or other good reasons from working in one week, to make up the lost time in subsequent weeks by averaging the increased working hours over a period of weeks, not to exceed fourteen. The southern lumber industry, it was asserted, will make a concerted and vigorous drive to secure these amendments.

### Fires in Virginia

In southwest Virginia two serious forest fires burned over approximately 10,000 acres late in November, the first on Brushy Mountain near Chilhowie, the second near Smyth. In South Carolina, according to State Forester H. A. Smith, the situation early in December was acute, particularly in the low country north of the Santee River. Mississippi was experiencing no severe fires, but the State Forestry Commission and Park Supervisors were seeking increased state funds for organized fire protection. They revealed that two-thirds of the forest lands in the state receive no organized fire protection, that twenty acres of unprotected lands burn over to every one acre in protected areas, and that during the past year federal expenditures for forest and park work in Mississippi have approximated \$50 for every dollar appropriated by the state.

Establishment of a wildlife research project in Indiana to obtain scientific

data upon which game management and restocking operations can be based, has been proposed to the federal Biological Survey, Conservation Commissioner Virgil M. Simmons announced on December 7.

### Indiana Wildlife Study

This study, similar to those being conducted in other states, would be continued over a period of years and would be financed with funds being returned to the state under the Pittman-Robertson Act, which provides for distribution among the states of funds collected by a federal tax on firearms and ammunition. The research project, Mr. Simmons states, would enable the State Division of Fish and Game, among other things, to conduct restocking operations on a more scientific basis than is now possible.

In Minnesota, it has been announced that more than 86,300 acres of submarginal land, lying deep in the wilderness of the state's northern "big bog" country, have been purchased by the federal government for the Soil Conservation Service's Beltrami and Pine Island projects. The land lies in 678 different tracts south of Baudett.

### Minnesota Retires Land

Poor soil and the lack of available markets in this wilderness area have made it necessary to relocate many of the settlers on land better suited to agriculture. The land thus surrendered and being acquired by the government will be retired primarily for wildlife. Blockage of drainage ditches is expected to restore marsh conditions and one of the "great-waterfowl and aquatic fur-bearing" areas in the country.

And while Minnesota is retiring land for wildlife purposes, Wisconsin returned approximately 18,000 acres to the forests—for this is the area the state added in 1939 to its forest plantations, setting out 17,000,000 young trees in county forests and 5,000,000 in state forests. According to C. L. Harrington, superintendent of forests and parks, the area planted exceeds that of 1938 by 8,000 acres.

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## SCIENCE AND EQUIPMENT

### NEW DIESEL CRAWLER TRACTORS.

A new line of high speed Diesel crawler tractors—powered by General Motors Diesel engines—has been announced by Allis-Chalmers Manufacturing Company. The first of this new line—the HD14—is now available and other models will be released in the near future.

The HD14 weighs 27,000 pounds and the transmission with six forward speeds and two reverse provides forward speeds from 1.72 to 7.00 miles per hour and reverse speeds of 2.00 and 3.20 miles per hour.

The General Motors Two-cycle six cylinder engine is said by the manufacturer to provide smoothness and performance never before possible in a Diesel engine. Allis-Chalmers, in testing this engine, has moved over two million cubic yards of earth on two of the largest construction jobs in the country—the Rio Grande flood control system and the Pennsylvania Turnpike—in addition to extensive tests on logging jobs.

Other features include the use of the new "Positive Seal" truck wheels, which eliminates the regular 10-hour greasing and requires lubrication only once every 200 hours. New steering clutches and brakes of a bi-metallic material are used which are said to make a marked reduction in maintenance expense by increasing the life of these parts many times. The HD14 is designed to handle the larger scrapers, 12-14 foot blade graders, bulldozers, trailbuilders, rippers, winches, logging arches, wagons, snow plows, and other auxiliary equipment.

### NEW "LOAD LUGGER"

An improved Model "CH" of the Brooks Load Luger is now in production by the Brooks Equipment and Manufacturing Company. According to the manufacturer, this is a new design, which represents the latest development in detachable bucket equipment for truck hauling. It is easily mounted on any standard chassis, and it offers important advanced features that result in faster action, easier control and higher truck efficiency.

Correct load distribution, well forward of the rear axle, eliminates excessive strains on the chassis and enables a ton and a half truck to carry a fully loaded two cubic yard bucket. A unique jackleg device, attached to the rear end of the Load Luger frame, relieves the truck chassis of the overhanging load when the bucket is being raised, and makes counterweights unnecessary.

Simplified control is a feature of the new Load Luger. The driver handles all operations from the cab, using one lever for controlling the hydraulic hoist and for engaging the dumping hook in discharging the bucket. The Load Luger buckets are one-piece units, made of heavy steel plate,

electrically welded and reinforced. They will hold any material without leakage, including sand or liquids.

The new Model "CH" Load Luger, operating with five to ten buckets, will replace an equivalent number of trucks and will show large economies in time, labor and equipment maintenance on all types of material hauling jobs where hand loading is employed.

### BOSWORTH FIRE TRENCHER

A demonstration of the Bosworth fire trencher was recently staged at the Forest Service training school, St. Regis, Montana, on the Cabinet National Forest, attended by officials of Cabinet and adjoining forests. The trencher is mounted on a bicycle frame. On the Bendix model is an outboard motor rated at four horsepower. The weight of the machine, including wheels, is ninety-six pounds.

The machine is pushed ahead by the operator. The outboard motor operates a double set of small revolving hammers at high speed, which tear away the rock, brush, earth, roots and other obstacles, making a practical trench. It is necessary to brush out the trail, as progress of the machine would be greatly impeded if dragged through brush. The head of the machine is a U-shaped bar, to which a rope is attached. One or two men usually act as "horses" to pull it up steep hills, or wherever a pull is necessary when the machine is in operation. The machine meanwhile is making the trail. The machines are being manufactured at the Forest Service shops at Missoula, Montana. The trencher, named after Jim Bosworth, formerly stationed at Thompson Falls, Montana, was devised by him. The patent was applied for in the name of Jim Bosworth for the United States government.

## ANSWERS

### To Puzzle Picture No. 1

This is the nest of a white-necked raven near Dalhart, Texas. Because of the absence of normal nest-building materials, barbed wire was used to a considerable extent.

### To Name the Tree

- |                   |                   |
|-------------------|-------------------|
| 1. Persimmon      | 11. White Pine    |
| 2. Redbud         | 12. Beech         |
| 3. Black Locust   | 13. Sourwood      |
| 4. Honey Locust   | 14. Red Gum       |
| 5. Red Maple      | 15. Holly         |
| 6. Red Cedar      | 16. White Oak     |
| 7. Dogwood        | 17. Black Walnut  |
| 8. Sequoia        | 18. Hickory       |
| 9. Black Gum      | 19. Yellow Poplar |
| 10. Longleaf Pine | 20. Virginia Pine |

## A New Wood-Burning Heater

(Continued from page 37)

across the top of the heater between the top lid and the wood box lid to a smoke outlet.

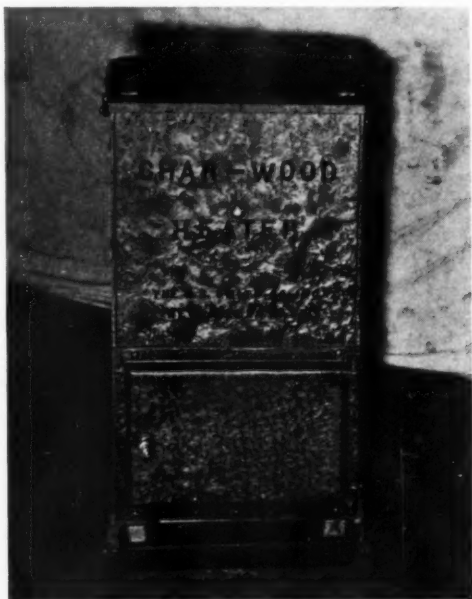
Everyone familiar with wood-burning devices will recognize that the heater described is quite different in design and principle. Certain recommendations can logically seem contrary to previous practices and yet be entirely justified. It is recommended that the smoke pipe connections be short, tight and that they pitch towards the chimney if possible.

Condensate can be prevented by using well-seasoned wood especially on the low or banked fires. It can be prevented by using a check damper but this removes warm room air and increases fuel consumption. Besides, a chimney must be kept warm in order to provide draft. While wood not well-seasoned can be used except during low fires, it increases the fuel consumption. It is better to let nature dry the wood rather than to use valuable heat to do the job.

It is also recommended that no smoke

pipe damper be used. The air damper is enough to control the rate of burning and during refueling the gas venting is more effective. During refueling the top lids of the heater are open. To avoid smoke, the air supply damper is automatically closed and the front vertical flue is shut off by the wood box lid. A sheet metal cover must be placed on the top rear of the heater. At the beginning of recharging only a small amount of charcoal lies on the grate. No smoke is present nor will any form until the fresh wood starts to heat. By the time the wood box is filled the smoke being formed will be drawn into the smoke pipe by natural draft. The sheet metal cover can then be removed and the heater lids replaced. The avoidance

of smoke during refueling is an important practical matter. In review, the present heater provides large fuel capacity for long firing periods, controlled rates of combustion, special provision for burning wood gases and the emission of heat where it will produce the greatest comfort.



The Char-wood Heater

## Wood in Modern Warfare

(Continued from page 32)

minimum of degrade. In this the Forest Products Laboratory's new method of chemical seasoning of wood comes into play. Under the new method the wood is first soaked in a chemical bath and then carefully kiln dried. Ordinary table salt may serve as the chemical. Such refractory species as southern swamp oak can be dried in this way in thirty-six days whereas under orthodox kiln drying 225 days are required.

The quantity of gun stocks needed in the World War was beyond belief. The first attempts to kiln dry green walnut, when the available air-dry material disappeared, resulted disastrously—one manufacturer reported that 60,000 blanks, worth \$1.20 each, had been ruined in a single kiln run. Today an infallible technique has been worked out for curing such stock. A method of making

laminated gun stocks has also been developed which permits the use of the small pieces of walnut not suitable for single piece stocks.

During war cargo space is at a premium. It is essential that as little room as possible be taken up by the containers, and yet they must be strong enough to protect their contents against rough handling—particularly munition shipments. As much as twenty-five per cent of the cargo space in certain overseas shipments was saved during the World War by intelligently designed wooden boxes. A redesign of a box to carry Browning automatic rifles resulted in a saving of \$1.50 a rifle—\$1,500,000 on each million rifles shipped overseas.

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**HAPPY NEW YEAR**

that are better than the originals, has been born since the World War. How much plastics will be required if the European War should cause metals to advance too high in price is not known. Of significance in this connection is the fact that research has recently produced an entirely new plastic from wood that is as cheap as any on the market. This plastic, which is made from sawdust or other refuse from woodworking plants, can be molded into instrument panels, switchboards, dial knobs, and innumerable articles used in communication for both army and navy. It is a good insulator and has other desirable electrical properties. It is a potential material for gun stocks.

Another new development, which is of potential significance to aerial warfare, is the improvement at the Forest Products Laboratory of lignin for use in storage batteries. The incorporation of the improved lignin with the negative battery plate enables the battery to maintain its maximum power in zero weather four times as long as formerly, and the life of the battery is also prolonged. This remarkable improvement, of course, permits the use of smaller and lighter batteries for a given output or affords much more capacity and reserve for the same-sized unit. When the same lignin is hydrogenated, a type of compound is produced that is useful in changing ordinary gasoline into gasoline of an octane rating suitable for airplanes.

Even parachutes, formerly of Japanese silk, can now be made from wood fibers.

And, last but not least, one of the most effective weapons of modern warfare—propaganda, is printed upon paper from wood.

## Asiatic Chestnuts

(Continued from page 21)

natural reproduction of broadleaf species such as tulip poplar and red oak.

Of all forest owners farmers should be in the best position to grow the Asiatic chestnuts on an experimental basis because they own approximately one-third of all commercial forest land in the eastern United States and because each farmer knows his land and is in position to select advantageous locations for the trees. Furthermore, the farmer has constant need for durable timber, poles and posts which blight-resistant Asiatic chestnuts are capable of producing. The nuts, also, may be eaten by men and animals. The nuts of the several Asiatic chestnuts vary greatly in quality. Those of Japanese chestnut are usually larger but poorer in quality than those of American chestnuts. The Chinese chestnuts are nearly as sweet as our American nuts.

The trees tested so far are mostly *Castanea mollissima* and *Castanea crenata*. A few seedlings of the Chinese timber chinquapin, *Castanea henryi*, which is not frost hardy in many locations and rather susceptible to blight, have also been tested but the tests are too meager for evaluation of this species.

## WHO'S WHO

Among the Authors in This Issue



Donald G. Coleman

DONALD G. COLEMAN (*Wood in Modern Warfare*), now associated with the Forest Products Laboratory, served in the United States Navy during the World War and subsequently led Carnegie research expeditions throughout the South Sea Islands, Australia, Dutch East Indies, and southern Asia. He was also in South America for a year at the Carnegie observatory. Returning to the United States, Mr. Coleman spent several years in aeronautical research for the National Advisory Committee for Aeronautics, and in 1929 entered the Branch of Research of the Forest Service.

W. C. LOWDERMILK (*The Eleventh Commandment*), distinguished soil explorer and expert, has just been made Assistant Chief of the Soil Conservation Service.

STANLEY YOUNG (*The Rare "Black Boots" of the Prairie*) is now gathering material for a book in the Biological Survey's series called *North America Fauna*,—a long favored project with him. After receiving his Master of Science in biology, Mr. Young turned predatory animal hunter for the government, and later was placed in charge of the government's big game preserves.

J. N. DILLER (*Asiatic Chestnuts as Foreign Trees*) is an associate pathologist in the Division of Forest Pathology of the Bureau of Plant Industry.

WYMAN SMITH (*Largest Community Forest*), an editor with the federal Forest Service, has written many articles and short stories. In speaking of community forests, he says that he is proud of his home county, Fond du Lac, Wisconsin, because it established one years ago when it bought a small acreage of splendid virgin hardwoods.

LAUREN SEELEY (*More About the Wood Stove*) is Assistant Professor of Mechanical Engineering, Yale School of Engineering, at Yale University.

RUFUS PAGE (*Boys and Girls—Do You Know Me?*) is extension forester with the Alabama Polytechnic Institute at Auburn. He is a forestry graduate from the North Carolina State College, and for a number of years was assistant extension forester in North Carolina.

HERBERT B. MCKEAN (*The Wage-Hour Law and the Southern Lumber Industry*) is an assistant professor of forestry at Louisiana State University.

THE COVER—"Snowshoeing Through the Yellow Pines"—in the Fremont National Forest in Oregon. Photograph by L. D. Bailey.



1940

BRIEF — TIMELY — AUTHORITATIVE

November-December, 1939

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By Erle Kauffman ..... from American Forests

## WAR AND WILDLIFE

By D. R. Barton ..... from Natural History

## A CHEMIST LOOKS AT WOOD

By L. F. Livingston ..... from Address

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